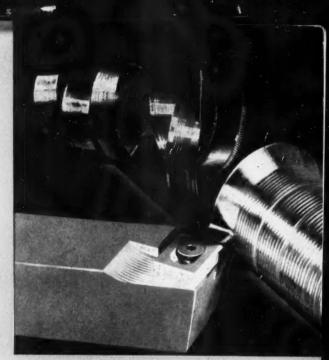
Machine and Tool



BLUE BOOK

ESTABLISHED 1906



MARCH 1953

Abrasive Wet Blasting

Machining at Oliver Tractor

Manufacturing Chevrolet Manifolds

Last Minute Washington News

How's Business?

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Only MARVEL builds all four

While it is true there are several builders of hack sawing machines and many builders of band sawing machines, only MARVEL builds BOTH hack saws and band saws. The fact is that MARVEL manufacturers 35 models of 10 basic types of metal sawing machines which include the world's fastest automatic production saw, the world's largest giant hydraulic hack saws, the world's most versatile band saw and the most widely used small shop saws.

With intimate and broad field experience in all types of metal cutting-off equipment and 35 different saws available, it is obvious that MARVEL Field Engineers occupy a unique and exclusive position in the industry. They are eminently qualified to make expert and un-biased recommendations covering the type, size and model of metal sawing equipment best suited to individual requirements—the most efficient, most accurate, fastest, broadest in scope and the most economical.

MARVEL is also the only manufacturer of both metal sawing machines and metal sawing blades. Because the efficiencies of both the machine Because the efficiencies of both the machine and the blades are interdependent, each upon the capability of the other, expert knowledge covering both saws and saw blades is essential to the proper appraisal of any specific sawing situation. Correct balance of cutting speed and blade life, feed pressure and blade tension are all potent factors in over-all performance. Here again it is the MARVEL field Engineer who is qualified to provide the comprehensive answer to your question. His job is to help you saw metal most efficiently—his services are available upon request-gratis.

Write for Catalog 49

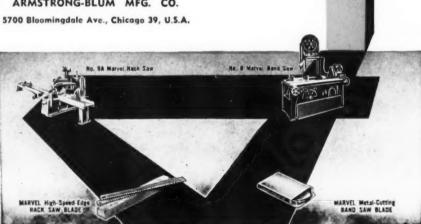
ARMSTRONG-BLUM MFG. CO.

"HACK SAWING MACHINES

"BAND SAWING MACHINES

"BAND SAW BLADES

"HACK SAW BLADES







- PRECISION BORING MACHINE

 Does the work of 2 or more machines
 - Reduces setup time to a minimum
 - Eliminates work transfers
 - Complete range of spindle speeds and feeds
 - 100" rapid traverse per minute, both directions
 - · Convenient quick-action controls
 - · Full-vision work areas

Table Trave	Longitudinal	.28*; Cross.	18*
Vertical Car	acity		28"
Number of	able Feeds—Dial —Inches Per Min	Type	16
Table Feeds	-Inches Per Min	ute 5/16	" to 20"
Table Rapid	Traverse-Both	directions	100"
Horsepower			71/2
Weight		8	100 lbs.

Power Feed ROTARY TABLES SELF-CONTAINED MOTOR DRIVEN UNITS

- Adapts any milling machine or horizontal boring mill for rotary milling and indexing
- Use it for automatic cycle milling and indexing, continuous face milling—or as automatic revolving fixture for special purpose work
- No setup time-just plug into electric outlet
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BALAS

receivements, completening their Collets are built to another parformance on these long step jets. You can obtain management recovery of opening supplies You can obtain management recovery of opening with resulting sovering in labor and material by usin below Callets. They are yith in helping you get continuous pool production of expensis persons your tothes and our materials. Select Collete are being used today in man please the



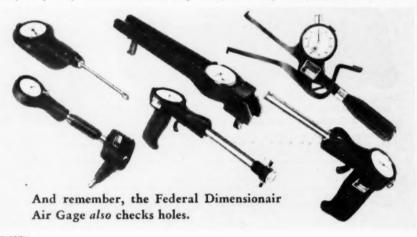
CLEVELAND 14, OHIO

WORLD'S LARGEST MANUFACTURED OF COLLETS EXCLUSIVELY



Whether a hole is deep or shallow, narrow or wide, whether it's difficult to get at, recessed or irregular, there's a Federal Indicating Gage to check it conveniently, and to precisely the dimension limits you require. With a Federal Gage you can inspect a hole as small as .122" and as large as — well, you tell us how big!

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A change over to new products, starts in the tool room and the die shop . . . starts with ARMSTRONG TOOL HOLDERS. In preparing for defense orders, the logical first step is to check your stock of ARMSTRONG TOOL HOLDERS. With the correct types for every operation, and the correct sizes for each lathe, planer, slotter and shaper, you will be able to start work on a moments notice.

ARMSTRONG TOOL HOLDERS reduce

"tooling-up" to the selection of a cutter and tightening of a set screw They permit oper-

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more pieces per hour, per man, per machine.
Produced by modern methods, in a specially-built tool plant, they are the lowest cost tooling you can buy. And, they are as available as your telephone for they are carried in

stock by your local supply house.

Use ARMSTRONG TOOL HOLDERS wherever possible for lower tool cost, saving in High Speed Steel, increased output and greater profit. Write for Catalog



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PUNCHING TOOLS & DIES

DETROIT ... PHILABELPHIA E LANSING CLEVELAND PUNCH & SHEAR WORKS CO.

Established 188

.... POWER PRESSES ..

FABRICATING TOOLS

CLEVELAND 14, OHIO



CUT AWAY FERROUS & NON-FERROUS METALS QUICKLY AND CHEAPLY WITH

FULMER HONING MACHINES

Hone as much as 1/16 inch of material at 1-1/2 to 2 cu. inch per minute

Cut away material to tolerances as close as .0001 (\pm) on size, straightness and roundness.

Generate true INTERNAL BORES from 1/4" up to 40" diameter.

Photo taken in very large steel mill.

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CHIPS RUN AS LARGE AS SIX INCHES

Stock is cut away quick ly, saving time and costs. Even a "novice" can learn to do this on a FULMER in a few hours.

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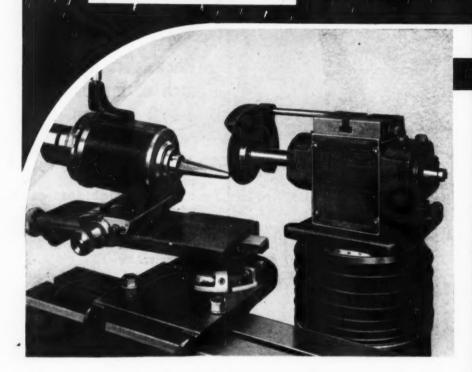




Photo above: No. 1 Radius Grinding Attachment mounted on the table of a CINCINNATI No. 2 Cutter and Tool Grinder. The four drawings illustrate the shapes that can be ground on your cutters.

CINCIN

NO. 1 RADIUS GRINDING

How often do you grind small die sinking cutters, tracer fingers and similar consumable shop items? For the occasional demand there's no better equipment than the No. 1 Radius Grinding Attachment on your cincinnati No. 2 Cutter and Tool Grinder. Two slides, each with micrometer dials, provide adjustment to the desired radius. The anti-friction pivot promotes easy swiveling, and adjustable stops may be set to the desired degree of swivel. An index plate on the workhead spindle has 24 notches. Several extra equipment items are available for the attachment, including motor drive for the workhead. ¶Would you like to have more information? For the No. 1 Radius Grinding Attachment, ask for circular M-1179-2.

For CINCINNATI No. 2 Cutter and Tool Grinders, look in Sweet's File for Mechanical Industries or write for catalog No. M-1734.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO



CINCINNATI No. 2 Cutter and Tool Grinder. Catalog No. M-1734 is yours for the asking.



NATI

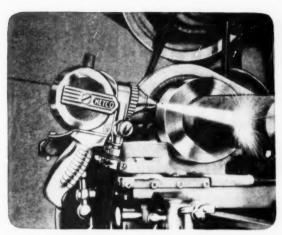
MILLING MACHINES - CUTTER SHARPENING MACHINES - BROACHING
MACHINES - METAL FORMING MACHINES - FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS - CUTTING FLUID



Illustrated above is the standard Acme Horizontal Hydraulic Broaching Machine designed and built by men who have been associated with the broaching process since its inception. Every machine is "Designeered" and special tooling is developed to meet specific needs. For example, at the right above is a closeup of a recent job on which Acme equipment broached involute serrations in tapered bores of gears and sprockets. Entirely automatic, production time is 15 minutes from floor to floorl Tell us about your problem. No obligation... Write today for information.

Also manufacturers of Acme Vertical Surface Broaching Machines, Hydraulic Presses, and the highly universal and productive Model U-31 Vertical Broaching Machine for internal or surface operations.





a really low-cost metallizing installation...

with the new Metco L-Gun





up worn brake-drum



Matellizing protective conting on steel plats

See other examples of metallizing for corrosion protection li-lustrated in our 8-page Bulletin in your Sweet's Plant Engi-neering File-Section 7a/Me.

The following names are the property of Metallizing Engineering Co., Inc. METCO! · Sprabond wire · Metco-Weld IREG U S PAT OFF

METALLIZING ENGINEERING CO., INC.

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs.
- Do your own hard-facing,
- Apply long wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallising Wires-With the new L-Gun you can spray .10, 25, .80 carbon steels, stainless; babbitts, brass, bronze, nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H. and the new selfbonding Sprabond wire.

it's Versatile - Use the L-Gun machinemounted or hand-held-it weighs only 4 lb. 2 oz. Do all kinds of metallizing work - shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.

Same High Quality as Other Metco Guns-The low air requirements of the new L-Gun have been achieved without any

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A Real Opportunity for the Smaller Shop-Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users-large and small.)

Free Bulletin or Shop Demonstration-Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course



R J McWaters, Matallizing Engine	aring Co. Inc.	
8-21 30th St. 1		New York
Please send me	more information	about metallizing
Please arrange a	demonstration in	my shop
Nume		
Name		

ANNOUNCING 4 NEW CUTTING OILS!

2 DUAL-PURPOSE OILS (lubrication and cutting)

SUNICUT 11-S for medium duty on automatic screw machines
SUNICUT 209-S for heavy duty on automatic screw machines

2 SINGLE-PURPOSE OILS (cutting only)

SUNICUT 102-S for heavy duty on automatic screw machines
SUNICUT 110-S for heavy duty service in broaching, threading,
gear cutting, heading and similar applications



All four oils keep parts and tools cooler, help maintain closer work tolerances, permit longer runs between tool dressings. All are odorless and light in color. In addition, Sunicut 11-S and 209-S have high lubricating value and are nonstaining.

For your copies of the technical bulletins describing these new oils, call the nearest Sun office or write Sun OIL Company, Philadelphia 3, Pa., Dept. MT-3.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY



PHILADELPHIA 3, PA. . SUN OIL COMPANY LTD., TORONTO & MONTREAL



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Jawis POWER TOOLS

TAPPING ATTACHMENTS

TAPS FLEXIBLE SHAFTS

AND MACHINES

ROTARY FILES

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REAMERS AND MILLS

DRILLS . BORING BITS

a farvis TORQOMATIC

can do your tapping jobs better









A complete range of Jarvis Torgomatics—available to fit any type drill press or tapping machine.

You'll like their trouble-free performance – their ability to produce quality threads – their increase in tapped holes per hour, the savings in taps – and their ease of operation!

We invite your inquiries about these highly efficient Jarvis Torqomatics that have outmoded all other slow, expensive and highly perishable machines of the past.

Jarvis Torqomatics are priced low enough to make it economically possible to replace your old tapping devices and attachments. A Jarvis
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will be glad
to consult
with you —
no obligation.

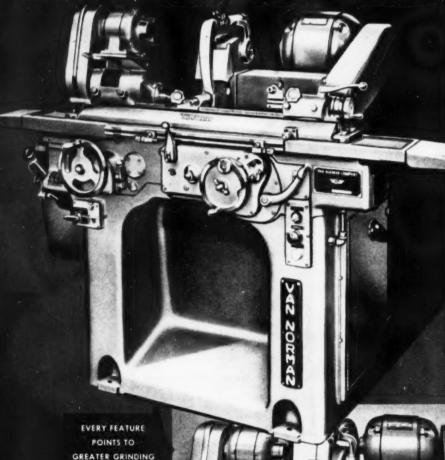
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SPECIFY YOUR NEW DRILL PRESS BE JARVIS TORQUMATIC EQUIPPED

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

New VAN NORMAN



GREATER GRINDING ECONOMIES

418 Cylindrical Grinder

Engineered to Save Time...Reduce Costs

Of Short-Run or Production Grinding of Small Parts!

Here's the new Van Norman Cylindrical Grinder that is making history in fast precision traverse or plunge grinding of small parts. Quick to set-up, easy to operate, this grinder cuts grinding costs in toolrooms, job shops or machine shops.

The 418 Grinder is especially designed for ease of operation. Recessed base design permits operator to sit or stand comfortably at the machine. Heavy-duty quality construction throughout assures smooth accurate finish.

COMPARE THESE ADDITIONAL ADVANTAGES

- Pope wheel spindle equipped with heavy-duty SKF double row cylindrical roller bearings.
- Single lever control for rapid traverse and plunge grinding
- Rugged base, wide table bearing ways, separate motor drives for wheel spindle, table and headstock
- Minimum floor space needed, only 43½" x 79¼"

Find out how you can increase production output of grinding small parts. Ask about the price, too ... it's exceptionally low for such a high quality machine. Write:

VAN NORMAN COMPANY

SPRINGFIELD 7, MASSACHUSETTS, U. S. A.

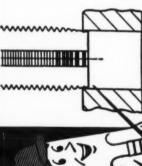






IN P.ODDITI

Correctly Ground Chamfer BATH TAP CHART



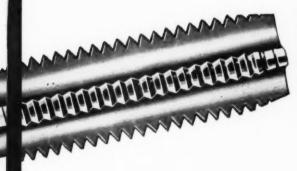
GROUN TROM TR

At work — the taps with chatter marks, Pete doesn't give a damfer. He always specifies Bath Taps For a smooth, clean-cutting chamfer!



At home — Pete cannot quite control Dull "chatter" by his Wife.
The "waste material" she picks up Is shortening poor Pete's life!

An important phase of Bath tap manufacture is chamfering - or,



An important phase of Bath tap manufacture is chamfering — or, the grinding of the tapered outside diameter at the front end or point. The grinding is smooth when cutting away the crests of the first few threads — you'll find no chatter marks to pick up material or load. All Bath Taps are carefully checked at the plant for length of chamfer or number of threads specified.

Taps will dull with everyday use — and it is well to keep these things in mind:

Is the chamfer sharp?

Is the chamfer the right length?

Is the point diameter right for the size hole to be tapped?

Only one thread should enter to get full benefit of the chamfer. Too small a diameter throws the burden of cutting on a few threads in the chamfered section. Result — a harder working tap, higher tap breakage and bad threads.

Start the job right — insist on Bath ground from the solid Taps and Gages — they're made for precision and long wear.

INSIST ON BATH TAPS
- PROFIT BY THEIR
PLUS - PERFORMANCE

PLUG AND RING THREAD GAGES . GROUND THREAD TAPS . INTERNAL MICROMETERS



No "Special Problems" Any More . . .



MORSE

DRILLS

MORSE



Take another good look at that range of applications for the 5 types of drills listed above. Now what's so tough about any "special job", when you can get all these Morse Special-Purpose Drills . . . and others besides ... from your Morse-Franchised Distributor right now?

Call him in today, and ask him what he recommends for that job of yours. He has the stock, the knowhow...and the full backing of Morse engineers . . . to trim your "unusual" drilling problems down to size, both in performance and costs. It's your move . . . and you can't lose!

MORSE TWIST DRILL & MACHINE COMPANY NEW BEDFORD, MASS.

(Division of VAN NORMAN CO.)

Warehouses in New York, Chicago, Detroit, Houston, San Francisco

Cutting Tools from your Morse-Franchised

March, 1953

Buy them by phone
Buy them by phone
Buy them by phone
Distributor and save
Distributor and save

UNCLE!

Are your machines begging for mercy because of misuse?

Blanchard Grinders, with proper grinding scheels, can and do give high production with extremely close tolerances for dimension and flatness. However, a No. 11 Blanchard user recently received erroneous advice on abrasive wheels from an outside source. The result was that 35 high-speed cam plates were ground on both sides in 1½ hours with surface finish of 24 micro-inches.

By referring the problem to Blanchard, it was easily demonstrated that the No. 11, with correct grinding wheel, would give desired results—90 to 100 cam plates per hour, with surface finish of 4 micro-inches, dimension tolerance of \pm .0002, and flat within 2 light bands.

Blanchard wheels are best for Blanchard Grinders — let Blanchard give you the benefit of their vast experience so that you too can get the most from your Blanchard machines.

"PLEASE CONSULT THE ENGINEERS WHO DESIGNED ME, AND LET THEM SPECIFY THE CORRECT BLANCHARD WHEELS, SO THAT I CAN WORK FOR YOU BETTER, FASTER, AND CHEAPER

Information on correct surface grinding procedure and wheel selection are given in "Work Done on the Blanchard" and "The Art of Surface Grinding."Write for free copies today!





PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.







DEPENDABLE FOR ACCURACY

Here's proof ... this Danly Special Die Set is used by one of the country's leading aircraft propeller manufacturers for "spotting in" all contour tools for a complete production line. Accuracy is a must because the tools, masters for duplicating planers and profilers as well as holding fixtures, must mate closely with the master pattern and with each other in the sequence of operations.

Dependable accuracy makes Danly Special Die Sets ideal for applications of this kind . . . and rugged construction makes them last longer, too, on any job. That's why leading diemakers everywhere prefer Danly Die Sets!

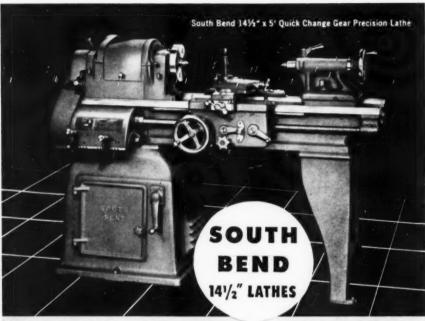
DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue · Chicago 50, Illinois

DANLY SPECIAL DIE SET SERVICE IS FAST AND CONVENIENT—CALL YOUR NEAREST DANLY BRANCH

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MILWAUKEE 211	East Wisconsin Avenue
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"Indicates complete stack



FOR FAST, PRECISION MACHINING

SPECIFICATIONS

 South Bend 14½" Lathes offer many advantages for precision machining. Ease of operation, speed, power, accuracy, and efficiency are some of the features responsible for their popularity. Often the precision and quality of finish obtained with South Bend Lathes are such that subsequent grinding, honing, or lapping operations are unnecessary. Substantial savings in capital investment, power consumption, floor space, and labor costs have resulted from their installation.

CHECKED:					
	9" and 10" BENCH LATHES	PLOOR LATHES	Vita and 1" Colled	DENL FRESSES	D INNO SHAPE
Hema		Сотро	·y		
Best		City & S	Natio		BOUTH
Building Better Tools	Since 1906 . S	OUTH BEND	LATHE . South	Bend 22, Ind	iana



CORNERSTONE

METAL WORKING PRODUCTION







150% INCREASE IN OUTPUT PER DOLLAR SPENT FOR WESSON TOOLING

COMPLETE PRODUCTION STO	LER SHAFT
CATERPHLAR TRA	
Fay	automatic lathe
Part Machiner Milli	rack roller shaft ng and centering 1046 steel
Material 614" dia	Wesson Rigident
	16" 10 7/16"
Food on Come	400 pcs. per hour
Production	Wessonmetal WH

OLD METHOD	WESSON ENGINEERED METHOD
Pieces Per Grind166	Pieces Per Grind 400
Tool Cost Per Piece\$0.0716	Tool Cost Per Piece\$0.0285
Grinding Hours Per Year	Grinding Hours Per Yeur

ON 1 JOB WITH 1 WESSON TOOL SAVINGS OF OVER \$240000 PER YEAR

WESSON METAL CORPORATION

LEXINGTON, KENTUCKY
Affiliated with WESSON COMPANY, Detroit, Mich.



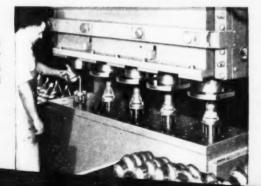
MAGA BA

SERIES B
GAP FRAME Double Crank Presses

Niagara B-4 x 72 Press at the General Machine Works in Los Angeles. It is shown here fitted with two dies for forming operations on an automatic deflector.



The same press as shown above arranged with dies for redrawing projectile parts in 5 steps. Shells are transferred manually from die to die.



NIAGARA MACHINE & TOOL WORKS . BUFFALO 11, N. Y.

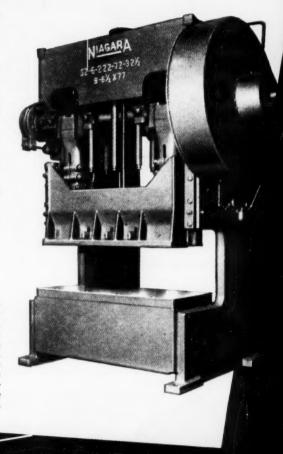
Manufacturers of a complete line of sheet metal working equipment ranging from small hand tools up to large power operated machinery.

Versatility and High Production

- Gap frame convenience with double crank width.
- Ideal for long progressive dies or multi-station dies.
- Rear of press open for full accessibility.
- One piece welded steel frame for maximum rigidity and long die life.
- Exclusive Niagara Sleeve Clutches for maximum productive strokes per minute and minimum maintenance cost.
- Niagara cushions for drawing operations.
- Automatic feeds for high production jobs.

Write for Bulletin

Niagara B-6½ x 77 Gap Frame Double Crank Press. Air actuated, electrically controlled sleeve clutch with friction clutch convenience and sleeve clutch economy. Air releasing brake. Clutch and gearing operating in a bath of oil. Air counterbalance for slide with surge tank over-size cylinder and pressure regulating valve to compensate for various weights of dies. Cross bar knockout in slide. V-belt motor drive.



bryant internal grinding



no. 1309-W

Finishes 2 bores and a taper straight and concentric. 2 wheelheads are used on this semi-automatic. Max. traverse stroke, 6". Max. grinding length, 3½".



no. 1109

For high production of small bores where accuracy of size and finish are required. Max. traverse stroke, 6". Max. grinding length, 3½".



no. 1316

Two wheelheads for high production of jobs requiring face and bore, or face and O.D. grinding. Max. traverse stroke, 20". Max. grinding length, 8".



no. 1116

A general purpose hole grinder for tool room, small shop, or general production. Maximum traverse stroke, 20". Maximum grinding length, 8".



no. 1416

Specially designed for grinding bores in long work, such as machine tool spindles. Maximum traverse stroke, 20". Maximum grinding length, 8".



ne. 1209

A fully automatic, high production machine for small and medium bore grinding. Max. traverse stroke, 6". Max. grinding length, 3".



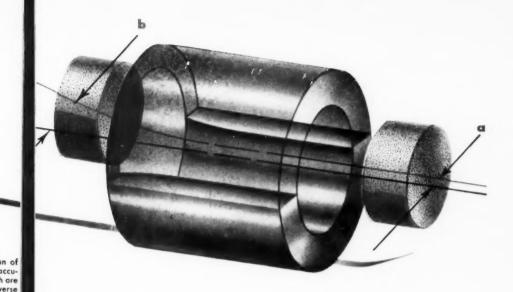
no. 1460

For production or single piece hole grinding on parts up to 60" diameter. Max. traverse stroke, 21". Max. grinding length, 16".



no. 2209

For precision and high production grinding of ball bearing races, gears, rolls, bushings, etc. Mox. traverse stroke, 6". Max. grinding length, "4".



BELL mouth holes are a common internal grinding error. General available information advises simply turning the workhead or changing the length of traverse to correct this error, to generate a straight hole. In the case illustrated above, where bell mouth exists at one end of the hole, neither turning the workhead nor changing the length of stroke will correct this error.

ding

hole

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ball olls,

ing

In order to grind a straight hole the wheel must traverse the work in a straight line parallel to the axis of the work. The wheel path (the line in which the wheel traverses) is controlled by the slides under the wheelhead. If the slides are straight and true, the wheel path will be a straight line. If the path of the wheel varies from a straight line, the variation will be generated in the work.

At point "a" the wheel path and axis of the work are parallel and the wheel is set to grind a straight hole. Because of an error in the wheelslide ways, the wheel path is distorted and the wheel is plunged into the back end of the work and the wheel path and work axis diverge as shown at point "b". Wheelslide error can introduce distortion of many types within the work in addition to the one illustrated. The remedy is to correct the wheelslide ways which will, in turn, straighten the wheel path. The wheel contact will be improved, resulting in better finish

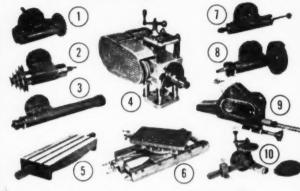
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- Hi-Speed Milling and Drilling Head
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- Universal Feed Table
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The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an outstanding value for maintenance, repair, tool room, and

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Press Brake



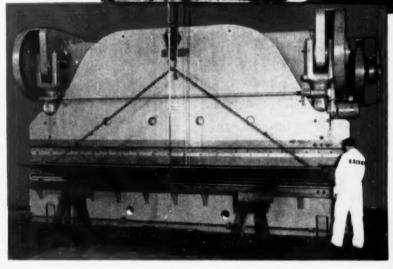


Illustration courtesy Easton Car & Construction Company, Easton, Pennsylvania

Here a Cincinnati Press Brake is forming ½" plate for wide sections of off-highway trailers, at the Easton Car & Construction Company, makers of a large line of products for industrial transportation.

By using this Cincinnati Press Brake, some welding operations were eliminated, which improved the product, and reduced production costs at the same time.

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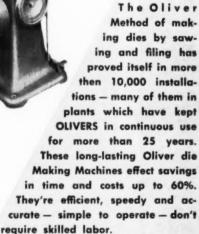
The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

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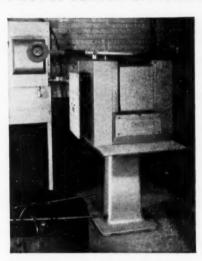
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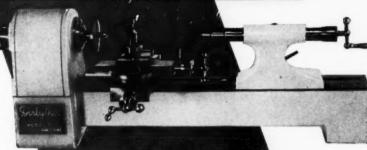
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DERBYSHIRE Model No. 750 Precision Lathe



Above is pictured the Model No. 750, with 22" bed, ball bearing headstock with draw-in spindle and V belt, Screw Tailstock and Two-Slided Slide Rest.



The following specifications apply to both types of the Model No. 750

Above is the Model No. 750 with 22" bed, ball bearing headstock with spring-bind collet closer, six-position turret, self indexing and semi-automatic with 5%" dia. holes.

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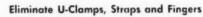
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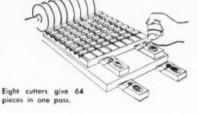
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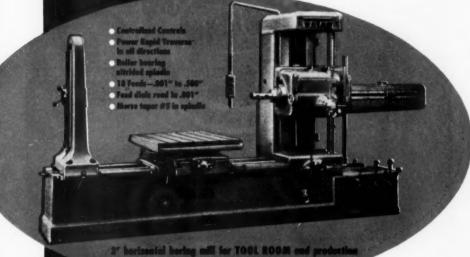
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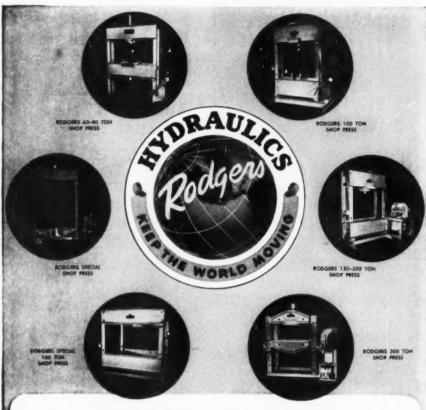
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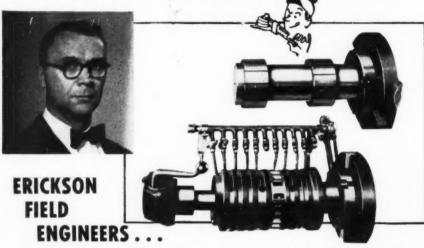
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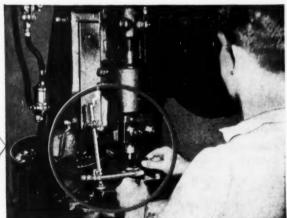
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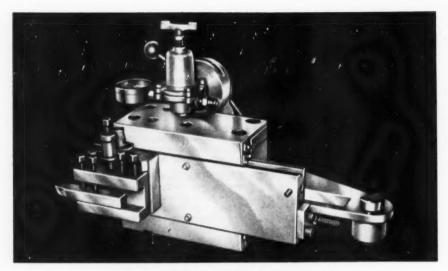
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Acro Pin Oilers fit over each leader pin and seal in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly



over leader pins. Eliminate bushing wear, leader pin scoring, and maintain die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.

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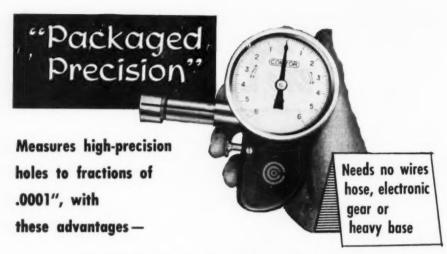
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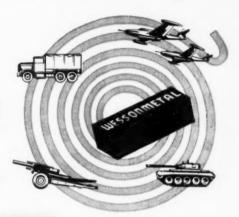
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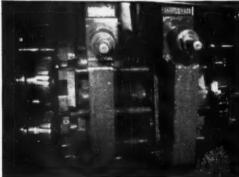


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A floor model, 21/2' x 4' equipped with full 71/2 h.p. geared-in-head motor engineered with positive drive, will cut all ferrous and non-ferrous solids up to 21/2" - pipe and structurals up to 4". Can be equipped for wet cutting.

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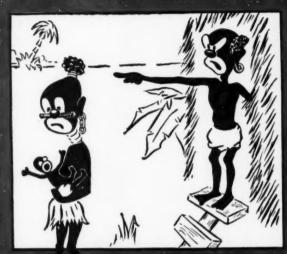
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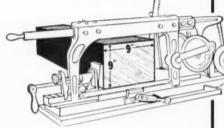
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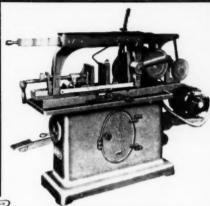
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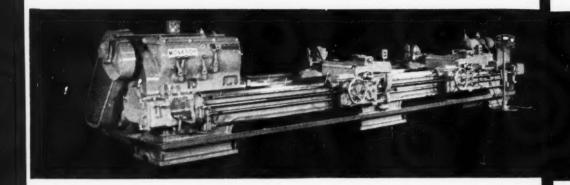
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FOR A GOOD TURN FASTER-TURN TO MONARCH

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PLUS SWING. For maintenance and repair work—for occasional big parts, light cuts on big diameters, and turning shafts with previously machined large sections, plus swing up to 60" and more can be provided. This Model 5N, shown turning a paper machine drum, swings 84"



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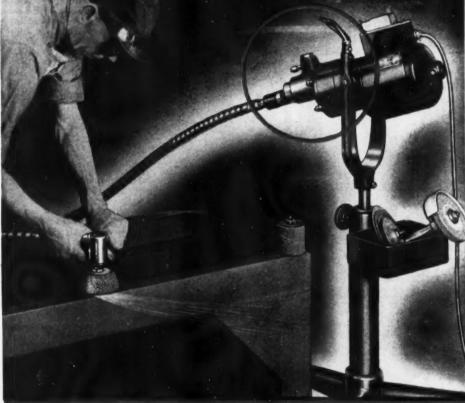


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See your dealer for a demonstration, or write direct for information. Also ask about the famous Strand line of conventional direct drive and countershaft Flexible Shaft Machines with up to 3 HP motors. Ask for Catalog 231A.





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USERS' ENTHUSIASM FOR Lusol SPREADS FAST FROM SHOP TO SHOP

Machine operators and their bosses, too, learn firsthand how Lusol speeds their production, lengthens tool life and makes working conditions more enjoyable. Then they tell the story around town and, soon, we get a phone call, "Show me!" The following stories are typical of many we've picked up from Lusol users all over the country.

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heard that drill 'screaming for help' and suggested trying Lusol there. Since this $2\frac{1}{2}$ " drill costs \$60 and we had to sharpen it several times in drilling a hole 3" deep, we really saved money with Lusol. Now the chips come out cool and we drill 7 or 8 pieces between resharpenings."

"As a subcontractor

we are welding stainless steel strip into jet engine exhaust pipes. That weld line machined badly and caused smoking. Our principal manufacturer recommended Lusol, which we put in a year ago last November. We're getting a beautiful finish, increased speeds and feeds, longer tool life and no smoke."

"Here in our own plant

the foreman of our lathe department saw us having trouble grinding silver off steel bearing-retainer-rings. The wheels would load up instantly and gouge the steel. Wheel manufacturers tried many different abrasives, but with no luck. We put a Lusol solution into those grinders and now our ordinary wheels do the job. 20 micro finish!"

"A grinding wheel salesman

told me that wheels (a competitor's, too) weren't our trouble. We were rough-grinding only 3 to 5 pieces before the wheels needed redressing. He suggested a change to Lusol, and now we grind 20 pieces with one wheel dressing. Of course, we're buying his wheels now."

Send for a free copy of the booklet "Lusol Gets to the Point"

F. E. ANDERSON OIL COMPANY, INC.

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MODEL "G"

UNIVERSAL

TOOL AND CUTTER GRINDER

Completely NEW from base to wheel head. Designed with these extra features to give you FASTER grinding performance.

- **●** Direct drive Excello Spindles
- ●360° wheel head rotation
- 10¾" swing over table
- Convenient controls for operating from any position.
- ●27" between centers
- 180° table rotation
- •2 speed manual table traverse

STERLING

- Micrometer taper adjustment
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The new Sterling Model "G" can easily handle all the tool and cutter grinding in the average shop. Available in either the Universal or Plain grinder.

SAVE TIME and do those EXTRA jobs with a Model "G" Sterling grinder

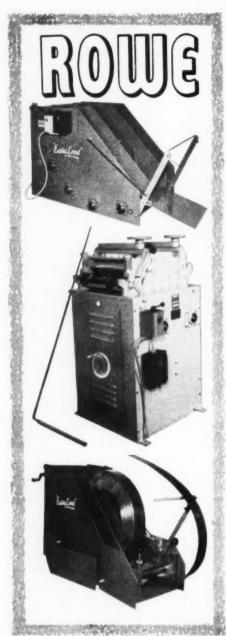
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"Easy Load" POWERED AUTOMATIC COIL CRADLES

Will handle 90% or more of all coil stocks. Power driven rolls. Instant width adjustment. Feed in any position. Constant slack loop of material provided for feeding punch presses, etc. Capacities from 200 lbs. x 6" wide to 15.000 lbs. x 48" wide.

ROWE AUTOMATIC STRAIGHTENING MACHINES

Two models provide commercially flat stock on thicknesses from .020" to .190". Rolls power driven. Reversing switch standard. Rate of feed variable from 7" to 110" per minute.

ROWE PINCH ROLL ATTACHMENTS

For positive feeding of troublesome materials between .010" and .150" thick. Have two powered pinch rolls. Exclusive loading feature eliminates dangerous operation of feeding stock between rolls. Offered as an extra cost accessory on new cradles or as an accessory for existing "Easy Load" Cradles.

Manufactured by

ROWE MACHINERY & MFG.

1506 N INDUSTRIAL BLVD. DALLAS. TEXAS

Write for name of distributor nearest you.



Protect Product Quality with this Fast, Accurate Grinder

Next time you're in the market for a production or toolroom grinder, take a look at the Abrasive No. 3B. From every angle — productivity, precision, ability to produce fine finishes — this grinder gives you the kind of output you need. Write today for complete illustrated catalog. Abrasive Machine Tool Co., 14 Dunellen Road, East Providence 14, R. I.

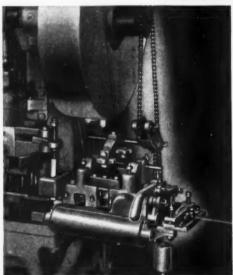


Abrasive Quality is Reflected in the Finish of Year Product



S EASY WITH WITTEK

Automatic Roll Feeds



Step up production by making your punch presses automatic! Wittek automatic roll feeds fit all makes and sizes of punch presses — provide maximum efficiency and extreme accuracy in the high-speed automatic feeding of strip stock. They are made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any of four directions. Length of feed is quickly and

easily adjusted to meet individual job requirements.

WITTEK Reel Stands Simplify Handling of Coiled Stock

A choice of standard models is available to facilitate handling a large variety of coiled stock...from small, light coils to those weighing up to 800 pounds. These larger reel stands automatically center the coils and provide frictional braking action to prevent overrunning and maintain uniform coil slack.

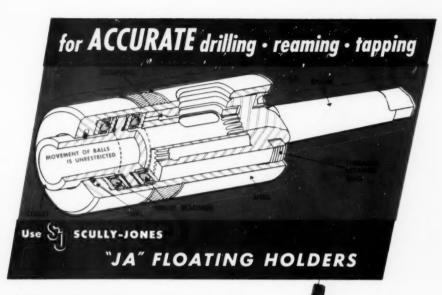
Write for full particulars

WITTEK Manufacturing Co.

4321 W. 24th Place, Chicago 23, Illinois



Automatic
ROLL FEEDS AND
REEL STANDS





UNIFORM CUTTING OPERATIONS

Clearance in the double-gear spline drive allows free movement of the floating and driving elements. This prevents binding and eliminates "dead" spots or zones which often cause rejects.

CONTINUOUS PRODUCTION

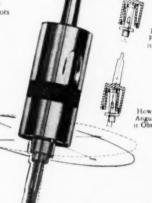
Two thrust bearings—placed close together minimize the effect of the force applied on the tool by the hole. Thus, tools float freely into alignment—reducing down time and damage to cutting tools.

TROUBLE-FREE OPERATION

Balls are free to move in the required direction or rotate around the collet, because the floating element is separated from the drive. Free movement of the balls eliminates confined reciprocating motion. This greatly reduces the scrubbing action characteristic of small rocking movements. The scrubbing action often causes rapid destruction of ball-thrust plates and prevents free float.

Write for Bulletin No. 8-50

showing complete range of sizes, specifications and prices.



How Parallel Float is Obtained

How Angular Float is Obtained

SCULLY -

1907 S BOCKWELL ST CHICAGO B ILLINOIS

RIGHT RT P

YOU GET LOW COST, FAST, ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

March, 1953

70



P AIR CYLINDERS

Our normal delivery is now 8 to 10 weeks or longer whenever possible. However, we can make occasional deliveries to meet your RUSH cylinder require-

DELIVERY

HARD CHROME PLATED PISTON RODS

Prevent Scratch-Damage, Nicks and Rust

DIRT WIPER SEALS

Protect Rods, Seals, Bushings



...8 - 9 weeks

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Precision Seal and other "Specials"

Standard Models excep

ments as follows:

All Delivery Promises Are Dated From Our Receipt of Complete Information



SOLID STEEL HEADS, CAPS and MOUNTINGS



CAPS and MOUNINGS

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND * YOUNGSTOWN * DAYTON * PITTSBURGH * PHILADELPHIA * BOSTON * HARFORD * NEW YORK CIT* BUFFACTO, \$51, ADLI * GRAND RAPIDS * DETROIT * FILNT * FOST WAYNE * SOUTH BEND * INDIANAPOLIS * MILWAUKE * LOUISYLIE * KANSAS CIT* & SEATIE * LOS ANGELES * SAN TRANCISCO * BALTIMORE * DENVER * \$1. LOUIS * MOLINE * CHICAGO * HOUSTON * TORONTO, CANABA # OTHER * AREAS

MILLER MOTOR COMPANY

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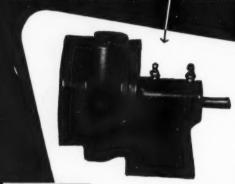
AIR & HYDRAULIC CYLINDERS . BOOSTERS . ACCUMULATORS

COUNTERBALANCE CYLINDERS



MAKE SURE YOUR
COOLANTS HIT THE RIGHT SPOT
TO KEEP TOOLS COOL

CENTRIFUGAL COOLANT PUMPS



MODEL NOR Right rotation

MODEL NOL Left

Direct connection; 1600 to 2600 rpm; 8 gallons per minute at 1725 rpm.



Write on your letterhead for professional edition of FULFLO MECHANICAL DATA BOOK A drop or two—a constant stream— FULFLO PUMPS pump and circulate the fluid just where and when it will do the most good.

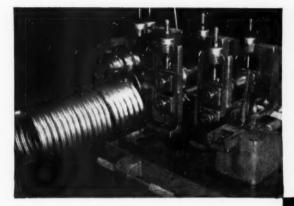
FULFLO COOLANT PUMPS prolong the life of your tools—when production demands so much and tools must do more work longer. And when replacements are expensive or scarce. Install FULFLO COOLANT PUMPS TO DO MORE WORK FOR LESS.

FULFLO engineers will advise what type will do the job best. Write on your letterhead for professional edition of FULFLO MECHANICAL DATA BOOK.



THE FULFLO SPECIALTIES CO. Inc.



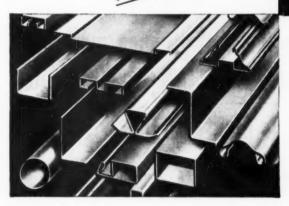


CURVING and coiling to almost any diameter, are two out of many operations which can be performed in a Yoder roll forming machine. As fast as formed, the sections can be continuously coiled and cut to length to make rings for auto hub caps, headlights, wheel trim, stator rings, etc., at a huge saving in cost of materials and labor.

Among other operations which can be tied in with cold roll forming may be

Cunving and Coiling and Makin Ring Makin

COLD ROLL FORMING



mentioned embossing, notching, perforating, welding, flattening, lock-seaming, filling and closing tubular shapes, wrapping, edge trimming, etc.

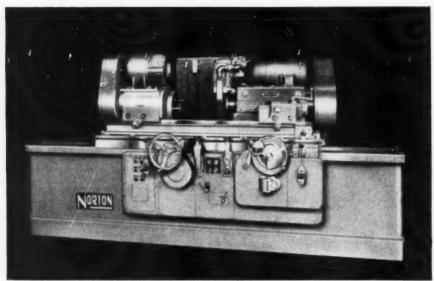
In the design and assembly of production lines of this character, the know-how of the Yoder engineering staff is at your service. The Yoder book on Cold Roll Forming deals broadly with the most important phases of the subject. Ask for it.

THE YODER COMPANY 5509 Walworth Avenue Cleveland 2, Ohio

Complete Production Lines

- * COLD-ROLL-FORMING and auxiliary machinery
- * GANG SLITTING LINES for Coils and Sheets
- * PIPE and TUBE MILLS-cold forming and welding





NORTON 10" TYPE CTU SEMIAUTOMATIC GRINDER is first choice in production lines and in job shops. No other cylindrical grinder offers you such a unique combination of speed, accuracy, flexibility and sturdiness. Norton 10" CTU's have doubled production . . . replaced 2 or 3 machines . . . eliminated operations . . . given operators the "Touch of Gold" by making them more productive. Catalog No. 1787 gives you complete data.

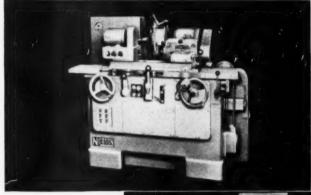
These Norton cylindrical grinding machines give you "TOUCH OF GOLD" value ... in your profit margins

The Norton CTU is such a moneymaker it brings you the touch of gold. It adds value to each piece of work it handles — and it actually cuts the cost of grinding... thus adding to your product profits.

It's easy to see why. Your operator loads the work . . . touches one lever . . . and stands by while the machine does the rest . . . as easy as 1-2-3.

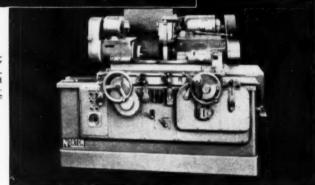
Work is automatically ground to size under electric timer control . . . and the wheel head resets itself for the next cycle.

All three basic Norton CTU Semiautomatic Grinders: 4", 6", and 10" offer you the same advantages over their different ranges of work sizes. You can also get the 6" grinder with a 10" swing and the 10" grinder with a 14" swing by specifying Type LCTU. The Norton line of Type



NEW NORTON 4" TYPE CTU Semiautomatic Grinder in 12" and 18" work length capacities now makes it practical for you to apply highfinish grinding for adding value to small parts. Catalog No. 531 gives you full details.

NORTON 6" TYPE CTU Semiautomatic Grinder, in 18" and 30" work length capacities, has a performance record that's worth investigating. Catalog 1488 tells the whole interesting story.



for your product

CTU Cylindrical Grinders also includes plain machines for traverse grinding. Your Norton Representative will be glad to help you choose the one that best fits your requirements.

For complete information, see your Norton Representative or write us direct for the catalogs listed under the machine illustrations. NORTON COMPANY, Machine Division, Worcester 6, Mass.

Modernize With NEW

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GRINDERS and LAPPERS

Waking better products
to make other products better

District Sales Offices: Hartford New York
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Toronto 5, Ontario

A Proven Method of Reducing Your Tap Breakage

Excessive tap breakage means excessive production costs. That's why so many manufacturers use the precision tap sharpening method to keep tap breakage at an absolute minimum.

What is the precision tap sharpening method? Briefly, it consists of grinding each tap precisely to produce uniform spacing of its cutting edges, accurate and equal hook angles on each cutting edge, and concentric chamfers.

THE IMPORTANCE OF PRECISION SHARPENING

Taps with uneven cutting edges are especially vulnerable to breakage. Uneven cutting edges mean errors in indexing. One land of the tap is ahead of the other, thus placing a greater share of the load on that land and causing it to cut deeper and oversize. Precision sharpening corrects these errors. A tap cutting evenly on all lands is much stronger, much less apt to break, and it cuts closer to size.



CLOSE-UP OF PRECISION TAP SHARPENING

Photograph shows one method of holding small tap on Blake Tap Chamfer Grinder to reduce vibration at point being ground.

BLAKE TAP SHARPENING EQUIPMENT

The Blake Flute Grinder and Blake Tap Chamfer Grinder are the two machines which enable you to grind taps to the high degree of accuracy necessary to keep tap breakage down to a minimum.

For more information, write us for MACHINERY article, "Why Taps Should Be Sharpened Precisely" and descriptive Bulletins on both Blake machines.

IT'S A FACT! YOU CAN REDUCE YOUR TAP COSTS 50 to 75% by installing Blake tap sharpening equipment and sharpening your taps as you do other metal cutting tools.

PUT THIS COST-CUTTING COMBINATION TO WORK FOR YOU NOW!



BLAKE CHAMFER GRINDER
(Described in Bulletin 552)
(Described in Bulletin 651)

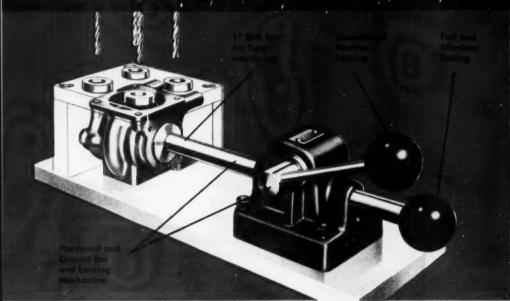
ACCURATE, TRUE-CUTTING TAPS
LESS TAP BREAKAGE
600% MORE PRODUCTION PER TAP
UP TO 75% REDUCTION IN TAP COSTS

Write for details about both machines!

EDWARD BLAKE COMPANY 440 CHERRY ST., WEST NEWTON 65

BLACK DIAMOND PRECISION DRILL GRINDERS . . . WALTHAM CUTTER SHARPENERS . . . SURFACE FINISH STANDARDS

BOOSTS PRODUCTION . . . CUTS TOOLING COSTS



The famous Heinrich patented "Circle-Grip" locking mechanism . . . the same screwless, positive locking design proved in more than eight years of industrial use . . . is now available as the Heinrich "Grip-Master" Fixture

Lock. Applicable for all types of drilling, milling operations, etc. Eliminates special locking details; simplifies jig and fixture designing; wide work clearance; no screw threads to wear out. Ask your Dealer to demonstrate it.

HEINRICH "GRIP-MASTER" SCREWLESS VISE ALSO USED AS FIXTURE BASE STRUCTURE

Enjoy savings up to 75% on tooling costs using "Grip-Master" Screwless Drill Press Vises. Instant action; just a press on locking lever and "Circle-Grip" mechanism provides a hold that hammer blows cannot break! Hardened, precision ground for long service.



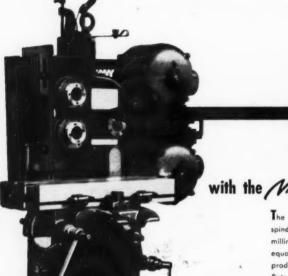
NEW CATALOG FREE!

Be sure you have a complete Heinrich Tool Catalog in your files. Your copy will be sent free upon request.



DEPT. 103-C • RACINE, WISCONSIN

Drill Press Vises • Fixture Locks • Nibblers • Punches • Rod Cutters



TWO ONE

with the Nichols Double-Decker!

The Nichols "Double-Decker" Twospindle Miller actually gives you two milling operations in one pass! It is equally adaptable to small or large lot production of small parts where parallel flats or grooves, or opposed faces cannot be straddle milled, or otherwise must be indexed for two operations with a single cutter. Its time-saving features are readily apparent. Spindles may be separated from 4" to 7" (or more) to accommodate various sizes of cutters and work. Table can be arranged for hand operation or with automatic work cycle, and with high or low spindle speeds.

CONDENSED SPECIFICATIONS

Table Working Surface 6%" x 21"

Lengitudinal Travel 10"

Transverte Travel 7"

Canter Distance of Spindles

Available Between 3%" and 14%"

Spindle Speeds Available up to 5000 R.P.M.

Net weight apprax. 1250 lbs.

Inquiries must be submitted in detail, as specifications and capacities are governed by user's needs.

MANUFACTURED BY W. H. NICHOLS COMPANY WALTHAM, MASSACHUSETTS

Write for catalog giving details on

lever, screw and air-feed models, plus

three types of double spindle Nichols Millers.

NATIONAL DISTRIBUTORS NICHOLS-MORRIS CORPORATION

76-G Mamaroneck Av.
White Plains, N. Y.



you save mounting costs, increase production runs

First: "Detroit" craftsmen, working with finest precision equipment, take pride in the superior quality of every "Detroit" Die Set. Second: Every set is fully assembled and inspected at the factory. Here are complete inspection facilities and testing skill that mean each "Detroit" Die Set is right before it is shipped.

For prompt delivery, or information, call your "Detroit" representative.

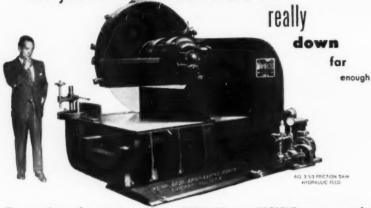
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CORPORATION



are your **CUTTING COSTS**



you'll never know for certain until you COMPARE your PRESENT cutting speed with

HIGH SPEED RICTION SAW!

What is friction sawing?

It is a proven means of using mechanical heat to cut steel. The weakened steel is removed by each succeeding section of the cooled saw blade-with no apparent wear on the blade.

Fastest, all-around cut-off machine in the shop. No set-up changes required to cut any sequence of structural shapes. No distortion. One Kling Friction Saw will take the place of several separate shears or slow speed saws. Cuts alloy steels, too, in record time. Because blade life is measured in thousands of cuts, you eliminate downtime and save on tool costs.

Free friction sawing information. Write today for free booklet on Friction Sawing. Learn how you can profitably apply

Friction Sawing in your plant. KLING BROS. ENGINEERING WORKS 1323 N. Kostner Ave., Chicago 51, Illinois

How long would it take you to cut these pieces?		Cut it with a Kling in 1	
8" x 8" x 34,3 lb. H Beam	Н	10 seconds	
100 lb, A.R.A. Rail	1	9 seconds	
6½" x 6½" x 19.8 lb. Tee	Т	5 seconds	
8" x 8" x 34" Angle	^	11 seconds	
3" Square		10 seconds	
4° Round	•	15 seconds	
6° O.D. Tube,	0	11 seconds	

† Approximate Times















600RMMP



Your local supply house carries Dayton Rogers', Layout Fluid.

Applicable to all metal. One merely wipes the surface clean and then brushes on the Layout Fluid.

Dries Instantly. No waste. Scribed lines are pronounced and contrast to the dark blue background, thus relieving eyestrain.

Assures greater accuracy and speeds up work. You will save time and money on all layout jobs.

A sample is waiting for you. Send for it today.

MINNEAPOLIS 7, MINNESOTA



Bridgebort

RET MILLING MACHINES

continue to make other methods obsolete

(Left) Light

Duty . . . for right angle milling and drilling narrow, deep

marrow, deep molds and cavi-

ties.

Right Angle Attachments

No matter how you figure it, today's work connot be handled economically on yesterday's machines and old fashioned tooling. In terms of speed, accuracy, conven-ience and costs, obsolete ience and costs, obsolete methods are a liability . . . never an asset.

11

We suggest you investigate the advantages offered by "BRIDGEPORTS" and comthe pare the possibilities with what you are trying to accomplish on existing equipment. Once you've done this, you'll do what countless other shops are doing . . . and replace obsolete ma-chine tools with modern, proved BRIDGEPORT TUR-RET MILLING MACHINES.

Condensed Specifications

8 Spindle speeds . . from 80 to 2720 RPM. Back Geared Spindle Drive Unit: utilizes full power at all speeds without belt slip-5000

convenience in changing tools.

An improved vise providing great gripping power. Streamlined for attractiveness and equipped with coolant trough. Rigid holding

MACHINE VISE

No. 2 BORING HEAD Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridge-port 1 HP Milling,

(Left) Heavy Duty

Heads.

for milling and drilling at right angles. Fits both Master and 1 HP Bridgeport





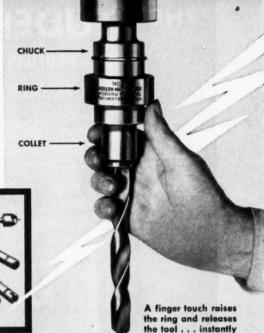


Speed up your production

Change tools without stopping . . . or even slowing the machine

MODERN-MAGIC QUICK CHANGE CHUCK and COLLET EQUIPMENT

examples of he many tool shown with ollets attache driven by MODERN-MAGIC CHUCKS



Modern-Magic Quick Change Chuck and Collet Equipment virtually eliminates costly lost time of revolving spindle machines. Used with such machines, tools are changed without stopping or even slowing the spindle. Changes are made from drill to reamer to tap instantaneously and safely while the machine is running at cutting speed. In this way, the Modern-Magic Chuck and Collet Equipment gives multiple spindle range to single spindle machines, increasing production and cutting cost. In high production shops, it has been proved they save time even though used only for changing from dull to sharp tools.

For full information, send for Bulletin M-103. In addition to standard Modern-Magic Chucks and Collets, it shows special types of each.

Only the ORIGINAL Modern-Magic Chuck and Collet Equipment carry the name
"MODERN-MAGIC" and are manufactured by Modern Tool Works, Rochester, N.Y.

MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION
SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

THE STUDER PSM-250

GRINDS PROFILES UP TO 16"

IN ONE SETTING



LARGER
FLAT OR CIRCULAR
FORM TOOLS,
SECTIONAL DIES,
GAUGES AND OTHER
PROFILE PARTS
CAN NOW BE
ACCURATELY GROUND
ON THIS

NEW STUDER PROFILE GRINDER



٠

The PSM-250 grinds profiles up to 16" long in one setting and accepts flat work pieces up to 41" thick and rounds up to 10" diameter. Templates up to 24" long are easily accommodated. The adjustable pantograph can be set in any ratio from 1.1 to 1.10.

CLEARANCE ANGLE AND RELIEF GRINDING

Attachments are available to grind different clearance angles on flat form tools—without correcting template form, and, to relief-grind punching and drawing dies.

AUTOMATIC TRACER GUIDE

This attachment automatically guides tracer bar along the template. The automatic, uniform feeding produces improved surface finishes and increases the life of grinding wheels. To guide tracer bar by hand, two screws are loosened to detach the device.

PRECISE GRINDING

Profiles can be ground to a tolerance of $\pm 0.0004^{\circ}$. Closer limits are obtainable when large ratios of reductions are employed.

WRITE FOR CATALOG ILLUSTRATING AND DESCRIBING THE NEW STUDER PSM-250

COSA CORPORATION

CORPORATION
Your source for all Precision Machine Tools—
405 Lexington Ave., New York 17
from Small Bench Lathes to Large Boring Mills

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Cousens Highway, Detroit 35, Mich.

Produced with Speed—Yet "Every Gear a Master Gear"



The Reishauer Tooth Flank Gear Grinding Machine, Type ZA, grinds spur and belical gears (up to 45° left and right) from ½" to 9½" O.D., and from 48 to 6 DP.

Gears ground on the Reishauer are produced speedily—with maximum pitch accuracy and excellent surface finish. Here are two typical examples:

SPUR GEAR	1	5° \(\text{HELICAL GEAR} \)
32	Teeth	76
20	DP	8
1"	Face	11/2"
20°	Pressure Angle	200
.005 to .008"	Stock Removed	.005 to .008"
8 minutes	FLOOR TO FLOOR TIME	20 minutes
.0002"	Maximum Pitch Error	.00024"
.00015"	Maximum Tooth to Tooth Spacing	.00015"
.0002"	Maximum Involute Error	.00025"
.00016"	Maximum Base Pitch Error	.00016"

For complete description of the Reishauer Grinder, write for Bulletin ZA 50.

COSA CORPORATION

Your source for all Precision Machine Tools from Small Bench Lathes to Large Boring Mills

IN CANADA Contact COSA CORPORATION, 18923 James Covrens Highway, Detroit 35, Mich.

March, 1953

16 operations

Ш

in 16 seconds

on an 8-inch, 6-spindle ACME-GRIDLEY Hydraulic Chucker

When Willys-Overland Motors, Toledo, O. changed methods to cut machining costs on larger production runs of this forged wheel spindle, they didn't buy the machine

on general claims. They bought guaranteed end results—16 operations in 16 seconds.

They bought a carefully engineered plan of tooling for this particular job—with hydraulic centering loader, unique toolholder combinations for the 16 carbide insert tools, including 5 interrupted cuts on the flange face at 860 S.F.M.

There is another reason—Willys-Overland, like all other big automotive firms, has employed scores of Acme-Gridley Bar Automatics from 10 to

30 years. Based on this experience, it is logical that they seek our advice about advanced practices in tool engineering of Chucking Automatics.

For, no other source offers so much in design and tooling experience on bar and chucking automatics—more than 45,000 machines built.

For end results, cost savings, ask your engineers to contact ours.

JOB FACTS

Front Wheel Spindle	51/4" long, 43/8" swing	Steel forging, AISI-C1040	16, all with Carbide Tools	16 seconds (225 per hr.)	
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ART	IZE	MATERIAL	PERATIONS	AACHINE TIME	-

The NATIONAL ACME COMPANY

170 East 131st Street . Cleveland 8, Ohio.

ACME-GRIDLEY BAR AND CHUCKING AUTOMATICS (1-4-6 AND 8 SPINDLE) + HYDRAULIC THREAD ROLLING MACHINES + AUTOMATIC THREADING DIES AND TAPS . LIMIT, MOTOR STARTER AND CONTROL STATION SWITCHES . SOLENOIDS . CONTRACT MANUFACTURING





He Uses DPS Power-Driven Assembly Equipment

HOPPER UNITS

Motorized... Selects and feeds Screws, Screw Blanks, Rivets, Pins, Nuts, Discs, Washers, etc. in a given position for primary and secondary operations. Eliminates manual handling of parts. Highly adaptable to Presses, Centerless Grinders, Thread Rolling and Slotting Machines and Special Machines.



POWER SCREWDRIVERS

An absolute necessity in present-day production assembling. Will drive screws as fast as one a second—no marring of heads or stripping threads

All screws driven to

uniform tension. Hopper fed . . . SCREWS ALWAYS IN SIGHT OF OPERATOR. 3 models to fit varying requirements.

You Can Benefit Likewise: Your First Step Is to Mail This Coupon



DETROIT POWER SCREWDRIVER CO. 2809 WEST FORT ST., DETROIT 16, MICHIGAN

Send your catalog and further details.

Company Name

Street Address

tv State



DETROIT POWER SCREWDRIVER CO.



prized

14 tools in



Besides changing from right to left in ten seconds, the R and L Turning Tool replaces an assortment of fourteen separate tools. It can be used for rough as well as finished cuts, meeting the most difficult job requirements.

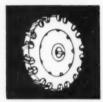
the tools a particular machinist would design for himself ...

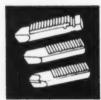


TURNING TOOL - TAP AND DIE HOLDER - UNIVERSAL TOOL POST - TURRET BACKREST HOLDER - CUT-OFF BLADE HOLDER - RECESSING TOOL KNURLING TOOL - CARBIDE AND ROLLER BACKRESTS - RELEASING ACORN DIE HOLDER - REVOLVING STOCK STOP - FLOATING DRILL HOLDER













8 REASONS WHY...

Lovejoy Cutters are your best buy!

Lovejoy milling cutters offer eight important advantages which help you achieve maximum accuracy, dependability, production and profit from your milling machines.

- 1 All Lovejoy cutters are insert-tooth type. Only worn out blades need be replaced — not the entire cutter.
- 2 Serrations are on front of each blade plain back makes full contact with body.
- 3 Positive-locking device on the blades assures rigidity, even on heavy intermittent cuts.
- 4 Advancing, replacing and sharpening of blades is fast and accurate.
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- 6 H. S. S., alloy and carbide-tipped blades available promptly from stock.
- 7 Lovejoy design is tops for blade interchangeability.
- 8 Lovejoy has had 35 years of experience can help you get best results from your milling operations.

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LOVEJOY
TOOL COMPANY, INC.

small parts production increased with



STANDARD

speed lathes

The Standard Speed
Lathe has no equal for
polishing, burring, filing,
countersinking and
other small parts operations.
Available in bench or
pedestal models, Standard Speed
Lathes guarantee you Speed,
Accuracy and Versatility.
Horsepowers from 1/3 HP
(1 speed) at 600 RPM up
to 1 HP (2 speeds) at 3600 RPM.

Also available: Speed-Chucking Lathes up to 5 HP for chucks up to 12". Multiple speeds or infinitely variable speeds. (50 - 3600 RPM.) Write for complete details.

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MORE EFFICIENT MILLING



OPERATING

CAPACITIES

10" Longitudinal table travel

.186" to 11.250" Feed range

3% " Cross table travel

6" Vertical table travel 8 Spindle speeds 62 to 2870 RPM



MILLING MACHINE

- Complete V-belt drive
- Handles full range of milling operations
- Timken bearing equipped
- Choice of manual, Production lever, or Change-O-Matic power feed
- Lowest cost miller on the market

YOU PUT the milling of small precision parts on a maximum-efficiency basis with the Atlas. It performs the full range of milling-from slabbing and facing cuts to end milling, keyways, finishing, and layout work - with the same exacting precision and dependability of large expensive machines . . . at lower cost.

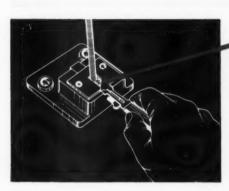
It saves many hours monthly on set-ups, saves on power and operating costs - frees bigger machines for jobs that only they can handle. Every feature of larger machines "built down to size" make this the outstanding low-cost miller. Your Atlas distributor will gladly supply full details, or write for complete catalog.



309 N. PITCHER STREET, KALAMAZOO, MICHIGAN

DEPENDABLE QUALITY TOOLS

New Waldes Truarc E-Ring Dispenser Speeds Assembly, Cuts Time and Costs



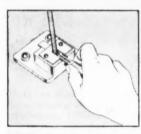


FOR GREATER TIME-SAVING, more efficient handling and assembly of Waldes Truarc E-rings,* here is an automatic, precision tool. Designed for one-at-a-time repeating action, the Truarc E-ring Dispenser can be easily operated by any assembly worker.

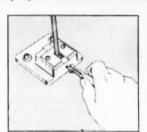
WALDES TRUARC E-RINGS (sizes 5133-9 to 50 inclusive) are now available packed on stackrods in quantities ranging from 250 to 500 pieces per rod. Stackrods are precision-made, allow re-loading in seconds. No interruptions to continuous flow in assembly.

*Dispensers for Waldes Truarc Crescent Rings (series 5103)

SIMPLE 1, 2, 3 ASSEMBLY OPERATION



Truarc applicator is pushed forward and grips a single E-ring.



Applicator withdrawn (new ring automatically feeds into place).



Ring is installed in groove on shaft. No waste time or motion,



WRITE, TODAY, FOR COMPLETE BROCHURE ON WALDES TRUARC E-RING DISPENSER

WALDES ROHINGOR, INC., LONG ISLAND CITY I, NEW YORK MALDES FRUME: RETAINING RINGS AND PLIKES AND PROTECTED BY ONE OF MORE OF THE FOLLOWING U.S. PATERIES 2 284 PART 2 182 FACE 2 241 6 452 2 440 6 241 2 425 145 2 441 6 161 2 444 6 66 2 445 145 2 443 144 2 443 252 246 247 847 247 647 647 2 447 650 2 447 648 2 467 648 4 440 165 2 447 648 2 447 648 2 447

Waldes Kohinoor, Inc. Dispenser brochure.

47-16 Austel Place, L. I. C. I. N. Y. Please send me the new Waldes Truarc E-ring

I am also interested in dispensers for Crescent

MT-085

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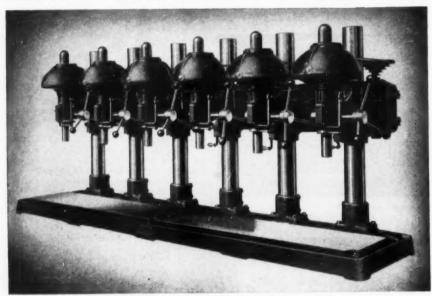
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Tips on Better DRILLING

MULTIPLE DRILLHEADS CUT SETUP TIME



"Buffalo" No. 18 Multiple Spindle Bench Drill

For example, a piece of work may require the drilling and tapping of three different size holes. The first three drillheads in the "Buffalo" No. 18 six-spindle drill, above, are set up for the drilling. The next three are set up for the tapping. Work then proceeds in sequence, with no further setup time required. Where large-lot production is done, the time savings are multiplied, and cost-per-piece

vastly reduced. "Buffalo" Drills are available in single and multiple spindle models in sizes from the smallest commercial drills on up to 2" capacity drills, to match your particular requirements. Write for complete information on this line of easy-to-operate precision machines.



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COMPANY BUFFALO, NEW YORK

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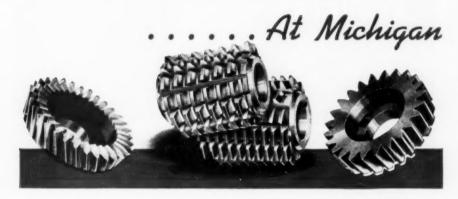
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STANDARD TOOLS ARE **CUSTOM ENGINEERED**



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Michigan Tool engineers always design hobs and shaper cutters with every step in the production of the gear in mind. They are thus often able to incorporate modifications in the tools that result in lower gear cost, faster and easier finishing, longer gear life, better tooth form, greater guietnessadvantages that mean better gears at lower cost.

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Double reduction horizontal speed reducer



Double reduction vertical speed reducer

Euclid Universal 3-way speed reducers are available in a range of sizes from fractional horse-power up to 3 horsepower, depending upon ratio. Some of the noteworthy features, found only in Euclid Universals, are offered as standard:

- Removable Base Plate allows worm shaft to be above or below worm wheel.
 Output shaft can extend to right or left, be vertical, or have double shaft extension.
- · Worm Gears Have 20° Pressure Angle.
- Oversize Shafts Available.
- Light weight (aluminum alloy) Housings.



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JAW-HEAD

Tough, resilient water buffalo faces deliver needed power, cushioned to protect fine finishes and delicate parts. Faces quickly and easily replaced. Safety-Flare handle gives comfortable, non-slip grip. When you need a "soft" hammer, make sure it's a C/R RAWHIDE Jaw-Head.

For further information write Dept. 22



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 Available from leading industrial suppliers. Also C/R Rawhide mallets and Rawhide mayls.





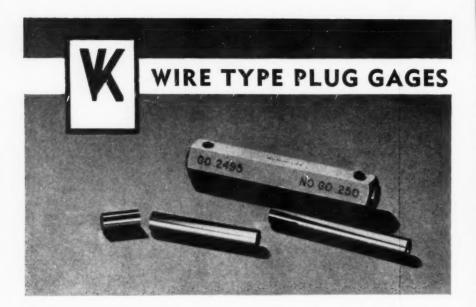
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Beaver Standard Tools are made to unusually high standards of quality. No stinting is permitted on workmanship or materials. Beaver Standard Tools are made with the same care and accuracy as precision aircraft parts . . . hard, and wear resistant, on the surface but with a strong, tough core.

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VASTLY LONGER-LIVED AND MONEY-SAVERS BECAUSE THEY'RE "CUT-OFF-ABLE" AS WELL AS "REVERSIBLE"

As a Van Keuren agent put it, "They're not only reversible, they're cut-off-able." And that means when you buy Van Keuren Wire Type Plug Gages, the sizes below 3½" may be cut off when ends become worn and as many as from five to ten gauges made available from the 1½" and 2" long units. It is not only economical and practical to use Van Keuren Gages but it is a very simple operation to cut off the ends by following instructions furnished on request. The illustration above shows clearly the cutoff and reversible features.

VK Wire Tyre Gages are available in

ZZ to XX accuracies in sizes from .001" to 1.000". They are furnished in alloy tool steel, high speed steel, chromium plate or tungsten carbide. Whatever the gaging job, the extra length provided in VK units will save you money. It will also pay you to take advantage of VK deliveries. In many cases we can ship your requirements from stock.

VK Wire Type Plug Gages are fully described in Catalog & Hand Book No. 35, available on request by writing to: The Van Keuren Co., 177 Waltham St., Watertown, Mass.



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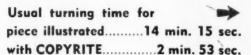


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For Export: Norton Behr-Manning Overseas Inc., New Rochelle, N. Y., U.S.A.

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"Couldn't do business without 'em." said

Mr. Austin Behlert, prominent gunsmith

of Cranford, N. J., as he reached for a HARD ARKANSAS Oilstone File to fin-

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action that all marksmen value. Mr.

Behlert has for years kept close at hand a complete set of oilstone files.

A SHARPENING STONES

division of NORTON Company

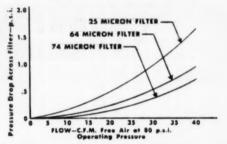
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New Norgren Automatic-Drain Filter



AUTOMATICALLY cleans the air
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INCREASES air power efficiency
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Excessive pressure drop means inefficient air equipment performance, stowdowns in production, unusually high compressed air costs

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Now you can have dependable, around-the-clock protection against damaging results of moisture in your compressed air lines—without attention. This amazing new Norgren Automatic-Drain Filter efficiently removes solids and liquids from air lines. And the drain operates automatically under constant or fluctuating air pressure, with or without air flow. Thus, it extends equipment life, reduces maintenance costs, improves equipment performance.

SIZES: for ¼", ¾", ½" air lines

FLOW: 0 - 35 cfm

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TEMPERATURE: +40° to +120° F.

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Torit Dust Collectors are available in both cabinet and cyclone types, in sizes ranging up to 5 h. p.

Here is a Torit 19-FB Dust Collector and Torit wheel hoods effectively capturing lint from two 12" by 5" brushes. Note the absence of all work interference and the minimum of piping.

Torit's efficient design lends itself to compact setups that fit into present or future production layouts. Sturdy construction keeps down maintenance costs and, as above, the

same switch starts machine and see our catalog in dust collector.

Torit Dust Collectors can be installed on a slim budget. They trim operating costs, and are effective in ridding your plant of dust or write for copy hazards. For details write:



TORIT MANUFACTURING CO.

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He is performing six consecutive drilling operations with a single jig at a single working station, with less handling time, and without changing tools. He is using the Lign-

o-matic turret on a standard

drill press.



PUT THE LIGN-O-MATIC TURRET IN YOUR SHOP FOR A FREE 10-DAY TRIAL ... IT WILL ...

INCREASE PRODUCTION — Many users report more than 300% greater output in actual production. Turret indexes faster than tools can be changed or work moved to another spindle.

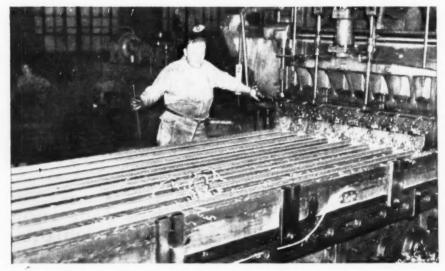
CUT COSTS — patented self-centering principle guarantees accuracy equal to drill press spindle. Lign-o-matic reduces tool and jig wear, cuts worker fatigue: adds up to faster work with fewer rejects. All parts completely guaranteed for TWO YEARS against defective manufacture.

PRICE - Model D, 6 spindles with No. 2 Jacobs male taper \$235.00 **DELIVERY** — Currently, 2 weeks.

TRY IT YOURSELF at our expense. If you are not fully satisfied for any reason, return turret within 10 days and pay nothing.

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411	(spindle taper)
NOW WE OFFICE STORAL TRIAL	☐ Please send bulletin with complete information.
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Walker Magnetic Chuck Reduces Production Time 50 Per Cent



The problem: Hold guide rails 8' to 16' long with small cross section; planed in units of eight, three tool bits per rail. Chuck must hold against twenty-four cutting edges, 90 sfpm, feed 0.060". Close tolerance and finish necessary—tool bits and work pieces cannot be magnetized.

Solution: Walker engineers recommended a chuck installation 60" x 198" with **balanced magnetic circuit** essential to proper chip control. The holding power of this installation is more than 200 psi.

Result: Set-up simplified . . . danger of distortion minimized . . . **two men** now doing a planing job which formerly required **three** . . . production time per piece cut in half . . . work pieces have better and closer tolerances. Neither tools nor rails are magnetized.

O. S. WALKER CO.Inc.

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Tool in natural finish hardwood case .. \$23.50

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• The Enco-Enrick Keyless Drill Chuck is the nearest thing to completely automatic chucking there is. It's self-tightening and self-centering. All you do is insert the drill between the jaws and give the knutled chuck body a turn. Drilling action does the rest, clamping the jaws on the drill in a powerful, rigid grip that automatically increases with the load. No key is needed. Slipping, retightening and scored shanks are eliminated. There's no better drill chuck buy today.

Sizes in a range of capacities for No. 0 to 1/6" drills. Contact your local Ettco-Emrick distributor for details and prices.

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Now—you can save up to 50% on grinding costs, even on close quarter work where every inch of free space counts! These two NEW Buckeye Belt Grinding Attachments are specifically designed for grinding on concave contours and confined areas. The BGA-12 and BGA-24 models provide the same economy, efficiency and fine finish as the standard BGA-21 and BGA-42 models, PLUS extra maneuverability for working in close quarters. Choose now from four models . . . select the Buckeye BGA that meets your grinding requirements.



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HEAVY, TAPERED HOLLOW SECTION - Places fabricated from 2 tapered welded strips of 12 gauge steel stock are given a 34" radius hand and a 41° edge bend on a Pines Size 4 Bender.



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COPPER ELLS - 3/4" ells are formed to 7/8" c/1 radius and cut off automatically two at a time from 20 ft. stock lengths on a Pines Size 3/4 Bunder.

For NEW IDEAS in METAL FORMING SQUARE TUBING-An eight foot length of SAE 4130 steel tubing 3" square, 1/4" wall, is compound bent to close tolerances. Segment indrel maintains smoothness of the 10" inside

investigate PRODUCTION BENDING the "PINES-WAY"

When you have a production problem of cold forming parts from round, square, rectangular, extruded or hollow stock to an even radius, or to different angles, chances are you will find the job can be handled more profitably on a Pines Automatic Bender. The examples shown here are only a few of the many different applications, in addition to ordinary tube bending, that are today handled efficiently on Pines machines. Production-wise and costwise, you will find bending the "Pines-Way" is a more accurate and profitable metal forming process. Investigate production bending today. Call on Pines engineers for assistance without obligation.



SQUARE STEEL BARS - Compound bands at each end and large center-radius halix are cold formed on a Pines Size 2 machine. Tooling costs reduced 75%, half of the production operations eliminated.



4" I.P.S. EXTRA HEAVY PIPE - Cold forming in place of hot bending on this Size 4 Pines bender eliminated a costly pickling operation at Allis-Chaimers' West Allis plant.



EXTRUDED ALUMINUM — Part of a production line set-up in a large aluminum fabricating plant, this small Pines Semi-Automatic bends an intricate extruded moulding for automobile window frames.

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To keep abreast with bending, ask to be placed on the mailing list for "Pines News", bimonthly mailing piece that gives facts and figures on new unusual production applications.





"—and they chopped down the Old Pine Tree."

Woodsmen Use Marking Devices!

When a forester indicates a tree is to be cut by the lumberjack he usually paints a mark just above the ground and another about breast-high, indicating it is to be cut for lumber purposes. If the tree is diseased he usually marks it with an X or other suitable device, indicating that it is to be cut for destruction or firewood.



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HEAVY BEVEL HAND STAMPS
CADILLAC Heavy Bevel Letters and Figures combine a high degree of hardness with toughness, insuring exceptionally long life.

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The faces of CADILLAC Steel Letters and Figures combine a high degree of hardness with toughness, insuring especially long life. All CADILLAC Marking Type and the recess in Type Holders are made in standardized dimensions. This means that type will fit interchangeably in hand holders, A system of distinctive marking machine holders or punch press holders designed symbols for inspection and confidential mark-for the size type specified. Due to the precision adhered to ings. Write for Symbols in manufacturing, they will when assembled in any holder make impressions in perfect alignment.



HAND STAMP SYMBOLS



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for small holes in small parts MODEL A-33 (NATCO)

Small Adjustable Multi-Spindle Driller & Tapper

Typical parts tapped en NATCO A-33 Light Sensitive Machine Illustrated

produces

2,200 parts per hour 22,000

10 x 32 tapped holes



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ENGINEERED
for Quality and
Quantity Production.



Call a Natco Field Engineer

to help you solve your problems in Dri ling, Boring, Facing and Tapping. NATIONAL AUTOMATIC TOOL COMPANY, INC., Richmond, Ind., U. S. A. Branch Offices: 1809 Engineering Bidg., Chicage * 409 New Center Bidg., Detroit * 1807 Elmward Ave., Buffale * 1903 Commerce Bidg., New York City.

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an Amazingly
LOW COST

Model 55

Milling, Drilling and Boring need not be expensive... Thousands of metal-working plants have learned it... Index Mills are the answer... Their demand is big and constantly growing. Pictured is the improved VERTICAL MODEL 55, a large capacity, versatile machine... Has a speed range of 80 to 2700 RPMs, 1 H.P. drive, 3½" quill, extra rugged spindle, capacity of ½" to 1½" end mills in tool steel. Spindle quill travel, 5½". Table 40" x 9" or larger.



An autstanding machine that has proved itself in highly satisfactory service for 15 years. While it is not a jig borer, it is widely used for accurate boring and locating. The improved spindle drive gives nine spindle speeds, an ample range for all operations. CAPACITY, ½ to 1° end mills in tool steel. TABLE, working surface 8° x 26′, 8′ x 34′ overall.



HORIZONTAL MODEL 60

A simple, efficient machine that in many ways equals or exceeds a light No. 2 in capacity. Designed for the average tool room, but its rigidity and low maintenance cost make it suitable for production shops. Standard table 40' x 9' with larger table optional. Compact and with all operating parts enclosed yet readily accessible. Controls conveniently located for ease of operation.

INDEX MACHINE Co.

540 M. MECHANIC STREET

JACKSON, MICHIGAN



HANNA Fluid Power Cylinders in your machine tools and equipment

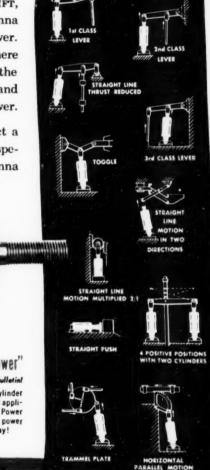
IF YOU HAVE A PUSH, PULL, LIFT, PRESS, CLAMP OR CONTROL PROBLEM, Hanna Fluid Power Cylinders can be the answer. The mechanical movements shown here may suggest ways you can simplify the actuation and control of machines and equipment to replace or reduce manpower.

In the majority of cases, you can select a standard cylinder model to meet your specific requirements from the broad Hanna Hydraulic and Pneumatic lines.





Bulletin 255 shows you 27 ways you can put cylinder power to work for you. 15 diagrams and 21 actual application photographs show how Hanna Fluid Power Cylinders can be used to simplify and speed up power motion problems. Write for your free copy today!

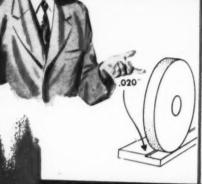


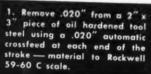


Ranna Engineering Morks

1754 Elition Ayeano Cateogo 22, Filia

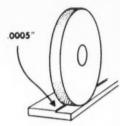
CAN YOUR SURFACE







Remove the work and measure its thickness. For extreme accuracy use DoALL Gage Blocks with Micro-Step accessories or electric comparator.



3. Put the work back on the machine and zero the elevating hand wheel Islip rings on the DoALL hand wheels make this a quick, easy job.) Now set the hand wheel to .0005" and cut across 1/3 of the work.

New 1953 DoALL Precision Surface Grinders **Establish New Standard of Performance**

THE test described above is just one of several that prove the accuracy,

rigidity and matchless performance of DoALL Surface Grinders.

There is no give, no wheel ride-up, no play in a DoALL Grinder. Accurate duplication of parts, time savings and elimination of spoiled pieces are the advantage of true precision work. With a DoALL Surface Grinder your operator will not have to remove the work from the chuck and measure if fee in The DoALL Grinder will accurate the work from the chuck and measure it for size. The DoALL Grinder will accurately produce parts to a predetermined tolerance from the hand wheel setting.

Surface grinding is often the starting point for accurate work and generally the finishing point when close tolerances are required. There is no substitute for perfection in surface grinding-can your grinder pass the DoALL test?

Proof of these claims can be yours without cost or obligation. Simply ask for a free demonstration. Operate a DoALL Surface Grinder in your plant, on your own work, and see how precision grinding will reduce operating costs.

Call your local DoALL Sales-Service Store, or write:

THE DOALL COMPANY, 254 N. Laurel Avenue, Des Plaines, Illinois







BAND MACHINES



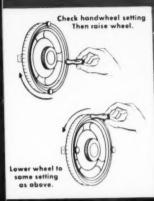
MAGNETIC CHUCK

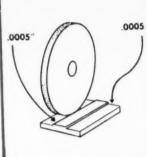


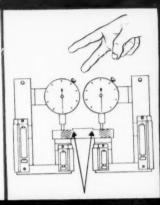
SINE CHUCK



GRINDERS DO THIS?







4. Check the hand wheel setting, then raise the grinding wheel. Now move the work piece to the opposite side and lower the grinding wheel to the exact setting of the preceding cut.

the

ting

the

this

the

cut

5. Now take another cut across 1/3 of the work on the surface opposite the first cut. The resulting cut should be precisely the same if your grinder is capable of accurate duplication.

6. Prove it! Measure three points in each cut with precision measuring instruments. If you make this test with a DoALL Grinder you'll find the work is perfect — the cuts are exactly the same depth!

New Models . . . New Sizes DoALL Surface Grinders for TOOLROOM and PRODUCTION Work

D-6 Models—6" x 18" and 6" x 24" sizes. Manual and hydraulic operation. 7" wheels.

D-8 Models—8" x 24" with 10" or 14" wheels. Manual and hydraulic operation.

D-10 Models—10" x 30" with 10" or 14" wheels. 12½" work height capacity, all models.













COOLANTS GRINDING WHEELS DIAMOND DRESSER DUST COLLECTOR CRUSH ROLLS

Manufacturer SAVED \$2290 How One

WITH A SUNDSTRAND MAGNETIC COOLANT SEPARATOR

Cleaning the coolant tank and replacing coolant can be costly. But when done right, savings can be accummulated. In this case the coolant tank had been cleaned twice daily. It is now cleaned twice weekly with a savings per week of \$22.90. Cost of the Sundstrand installation is approximately \$475.00. The unit requires no attention and little or no maintenance. Why not pick up dollars like this?



EASILY INSTALLED WITHOUT ADDITIONAL

PIPING

An important feature of this magnetic coolant separator is that it can be dropped into position on most open type coolant tanks. No additional

piping is required. Install one on your present equipment and compare its efficient operation with other units.



FREE ADDITIONAL DATA

This folder will give you the complete facts on the Sundstrand Magnetic Coolant Separator. Write for your copy today. Ask for bulletin 430.



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Division of Sundstrand Machine Tool Co. 1020-9th ST. . ROCKFORD, ILLINOIS Designed for ... HIGHER PRODUCTION WITH GREATER ACCURACY AT LOWER COST PER PIECE MACHINED

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thereby reducing your

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Changes from one tool to another is a matter of seconds. Three point locking feature and tapered shank assures repositioning and eliminates "run out." Send for catalog describing individual holders and adapters or for specific information on your machine tools.

PORTAGE Double-Quick TOOL CO.

1037 Sweitzer Avenue . Akron 11, Ohio

Teatured in this issue

Some Interesting Operations at Oliver's Crawler	
Tractor Plant	153
Wet Blasting for Precision Surfacing and Finishing Operations	162
Special Report on Grinding Machines	246

Some Interesting Operations at Oliver's Crawler Tractor Plant, by William F. Schleicher. This covers some of the interesting shop practices and original tooling ideas of this up-to-date Cleveland plant. One piece of equipment lowered machining time on a transmission case from 2.6 hours and two machines, to 45 minutes and one machine. Page153 Wet Blasting for Precision Surfacing and Finishing Operations, by Eugene F. Anderson. Wet abrasive blasting has been making possible some rather important savings where cleaning, surfacing and finishing of precision-built parts are required. Mr. Anderson takes us through many case histories that tend to prove the greater precision at less cost, Page162 How Chevrolet Oil Manifolds are Fabricated, by Herbert Chase. Oil manifolds constitute an exceptional feature of Chevrolet engines and are produced in exceedingly large volume from welded steel tubing that is manufactured from ribbon steel. The writer tells how the lengths undergo forming, piercing, and other operations before being assembled and soldered in fast setups. Page179 Drawing Cartridge Cases With New Horizontal Hydraulic Press. Volume production of cartridge cases, keeping, at the same time, the exacting tolerances required by ordnance, is a problem faced by American defense manufacturers today. Rheem Mfg. Co. of New Orleans, using specially designed Clearing hydraulic presses, shows how it has licked the problem in its plant.

 jig that he believes doesn't have the shortcomings of many jigs on the market today. Page201

"Stop Complaining About Your 'Dumb Dodos'" by Edmund Mottershead. This latest Foremanship Forum by Mr. Mottershead makes interesting as well instructive reading—dealing with the type of worker who is a little slower at catching on than the average. He shows that such persons definitely have much to offer, but that it takes intelligent, thoughtful direction on the part of the foreman to bring it out, at the same time keeping the whole shop happy.

This is the 27th Special Report on American Built machine tools. Also included in this month's report are: Descriptions of Late Model Tool and Cutter Grinders, and Specifications of American Built Machines. Page

the actual grinding.

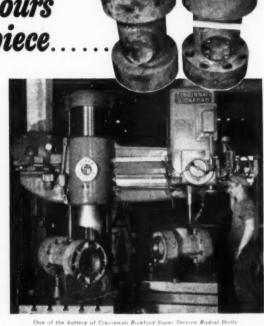
135

saving 2½ hours per piece.

Profitable experience brings satisfaction-and so you find 33 Cincinnati Bickford Drills of all types at the Grove City plant and 20 at the Mt. Vernon plant of The Cooper-Bessemer Corporation.

In the steel compressor bodies shown, and in the front and rear heads which involve similar drilling operations, 134", 24", and 2." holes are bored with a time saving over a previous machine of 212 hours, floor to floor per unit.

Handling time was much reduced, and the outstanding convenience and ease of control, combined with steady, accurate performance and dependability, effect these marked operating savings.



ark on compressor cylinder bodies



Ten Cooper Bessemer Type GMV six cylinder gas engines of The Coope Bickford Super Service Radial worked on these compressor cylinders



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnuti 9. Ohio U.S.A.

AS THE Editor SEES IT

The New Cabinet

Several weeks ago I had the pleasure of meeting informally with several members of the Eisenhower cabinet. These men had only shortly learned where to hang their hats and were consequently too new (and too astute) to say this or that would be done immediately. And yet, discussion with them left no doubt about their sincerity and their competence and the tenor of their thinking. These men may be amateur politicians in the sense that a knowledge of politics is of greater importance than professional competence, but there is no doubt about their ability and awareness of the enormous economic problems facing the country. Each of these men is a successful businessman and a specialist in his field. We have not always had specialists in important governmental

Economy was uppermost in their minds, economy based upon cutting governmental expense and an elimination of waste. They were blunt to point out that α reduction in taxes could probably only materialize in direct proportion to a reduction of the budget. Unfortunately, financial commitments of the previous administration leaves but a small amount which can be analyzed for possible savings.

Heartening to the metalworking industry will be the news that depreciation is foremost on the agenda for possible action.

A study group has been set up to look into the matter. And while we're still a long way from a sensible depreciation policy, at least we've saddled the horse, that's more than has been done in twenty years.

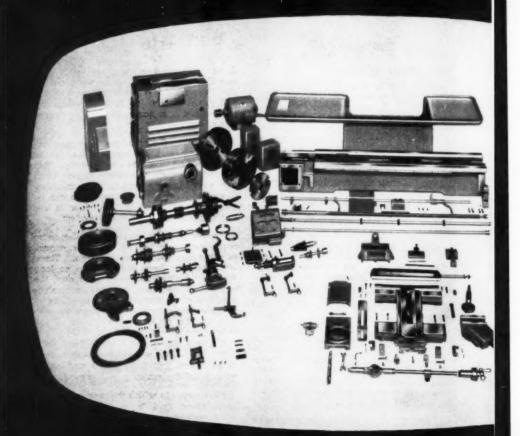
What about the problems these men will face? They will be legion. One of the knottiest will be the bureucracy, that bloated monster, whose tentacles reach into every private and governmental endeavor. Most of these bureaucrats are intelligent, patriotic citizens; the fault is less one of personnel than one of system.

Another problem which faces the entire administration will be the Congress, especially the Republican wing thereof. These worthies have been out of office so long that they believe this to be their day, the day when they can reassert themselves and really run things. Many members of Congress are competent and place the welfare of the country above party level. Others are of a mental level where they can barely distinguish bright objects on a clear day. They will be a problem. It is to be hoped that the wisdom and sound thinking of the majority will prevail.

The manner in which the new appointees have taken hold is encouraging. They bring an experience and intelligence into office with them that bodes well for the country.

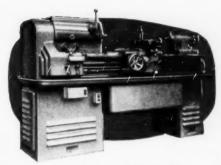
William 7 Schleicher

"see what makes the



THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI R. OHIO

Dual-Drive your best buy in the





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part by part, feature by feature...

FULL-POWER SPEEDS

Dual Drive's headstock design combines belt and gear drive to give you the widest range of speeds in its class—all at full horsepower. Twelve speeds from 28 to 1800 rpm.

OPTIMUM SIZE

15" swing to take care of virtually all of your medium-duty turning, 30" base center distance; more in increments of 12".

BIG FEED-THREAD RANGE

Ninety-six feeds from .0004" to .106". Forty-eight threads from 4 to 224.

CONVENIENCE

Single-lever speed control. Electric brake, forward and reverse spindle control at apron. Single-lever, positive-jaw feed control. Multiple automatic length stops. Many useful attachments.

ENDURANCE

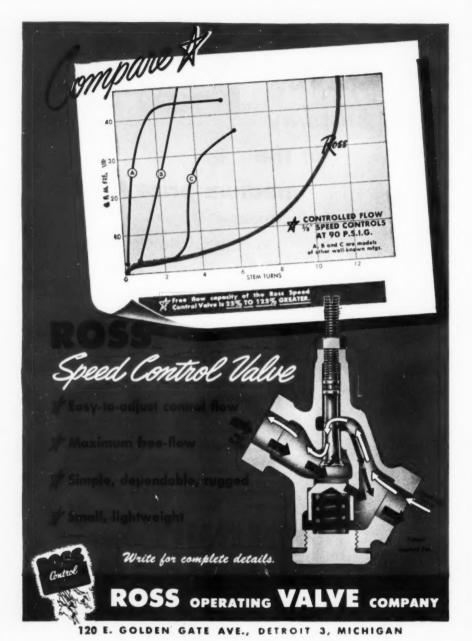
Totally-enclosed feed box. Automatic lubrication through headstock and feed box. Hardened steel gears and anti-friction bearings. One-piece, double-wall apron. Hardened and ground replaceable steel bed ways. American Standard taper key drive spindle nose.

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LAST MINUTE WASHINGTON NEWS



by Arnold Kruckman

Washington Correspondent

ENORMOUS DIFFICULTIES IN WASHINGTON



It probably puzzles those who are not close to Washington, or do not understand the spirit and manner in which Washington functions, why it is so difficult for any new Administration to get into real action. It takes the familiarity which is bred by time and experience to understand the real essence of the thing that is Washington. Any lack of action should not be blamed upon the President or his White House associates. Nor should the members of his cabinet, and others whom he has appointed

to head responsible Agencies, be regarded as at fault.

Obviously the transfer of the functions of Government from one major group to another after twenty years in itself is a tremendous job. The whole machine must be thrown from one gear to another. The points of view of the many thousands of subordinate officials must be focused on the new objectives. The new policies must be crystallized. The infinite number of smaller wheels and cogs must gradually be meshed into the new machine. And all this, under the very best circumstances, takes time.

The latest figure just issued by Senator Byrd gives the total personnel employed by the Federal Government in its civilian machinery in Washington, and elsewhere, as 2,560,478. Of this number 250,000 staff the departments, offices, and agencies in Washington. And bear in mind, there are always fleetingly temporary employees who are not enumerated in this total. It is doubtful whether there is anybody or any agency in the Federal Government who can give an absolutely accurate estimate of the number of persons who receive salaries or wages from Uncle Sam. Contemplation of this human machine is important, because it has far more to do with the success of an Administration than most people realize. This army of workers has it within its power to frustrate the policies and purposes of an Administration. In the intimacies of off-the-record discussions members of Congress will readily admit that they are practically at the mercy of this human mechanism. If you doubt this statement, consider the following facts.



Check hole sizes



and locations,



find centers.



gage slots,

and dozens of other uses with HORBERG precision taper



Pin Gages

SAVE TIME AND MATERIALS

Oil-hardened tool steel tapered pin gages accurate to +0.0001" - 0.0000"insure dependable sizing and location of holes and slots for machinists, setup men, tool and die men, inspectors, all who need precise hole measurement.

CONCENTRIC TAPER on lower half of each gage fits holes 0.0012" smaller than standard letter, fraction, and number size drill holes. Makes insertion easier. Permits gaging of odd-size holes and slots.

ALL GAGES are 11/2 inches long. Sets contain a pair of each size in a plastic case with 4-place decimal equivalents of each size plainly marked.

ALL ITEMS STOCKED FOR IMMEDIATE DELIVERY

THE GAGE COMPANY Quantity ST., BRIDGEPORT, CONN. @ \$45. Please Rush checked items and literature to Letter sets 52 gages (A-Z) Fraction Sets @ \$50. company 60 gages (1/4" to 1/2" in 1/4" steps) address Number Sets @ \$90. 120 gages (1 to 60) nome Stand alone @ \$10.

Billions have been spent upon housing in various ways and in all States of the Union. Billions have been spent upon rural electrification, reclamation, soil conservation, transport lines upon inland waterways: the Bureau of Land Management alone is said to own, on behalf of the Government, over 20% of al! the land of the United States. There are the great power Administrations such as the Bonneville Power Administration; and there is the Commodity Credit Corporation which last year had \$6,700,000,000 to spend upon those things of interest to the The Civil Functions Division of the Corps of Engineers spent over a billion dollars the past two years. The Federal Security Agency, on its various undertakings, spent over a billion and a half dollars last year. And then there is the Social Security Administration which had well over a billion dollars to spend last year despite the fact that it is supposed to have a reserve of \$13 billion in its Treasury. The \$13 billion, of course, is non-existent. It is represented by IOU's. The money was actually spent upon the business of the Government, to be replaced as required. And of course there is the TVA; the Southwestern Power Administration; the U.S. Spruce Corporation; the Warrior River Terminal Company which operates a railroad and a terminal in Alabama; and many other businesses which fifty years ago it was impossible to imagine as a part of And this enumeration does not take in the tremendous Government. international cartels, such as the Combined Coal Committees; the Combined Textile Committees; the Combined Tin Committee; the European Coal Organization; the Inter-American Coffee Board; the Inter-National Sugar Council; the Inter-National Wheat Council: and that extraordinary creation, the International Bank, which literally has the power to commit us to expenditures at its own discretion without reference to Congress or to any other source of Government.

It is estimated conservatively that \$80 billion are tied up in enterprises and business operations with which Government should have nothing to do. Many of them are operated by extra-legal corporations over which no regular Agency of Government has any control. It has been further estimated that these economic enterprises have recoverable assets in excess of \$50 To really grasp this picture it is necessary to bear in mind that the legal limit to which the country may be indebted is \$275 billion. Our regular Government debts, as of record at this time, total \$269 billion, plus another billion irretrievably pledged in commitments which must be fulfilled. These figures come from Congressman Ralph W. Gwinn of New York. But probably the most disturbing statement is the assertion by another close student of Government, and its operations, that

another close student of Government, and its operations, that
the debts for which Government is responsible, including those
of legal record and those which stem from the extra-legal corporations, and other wide-flung entities which focus in our Federal Government but over which there is little control, total
the almost incredible aggregate of \$700 billion.

It probably has become clear that these huge agencies,
known and unknown, with their colossal fiscal significance,
represent a human equation of almost inconceivable power that
gives those in Government, like the members of Congress, reason
to pause before they move against this power. It is known if
a Congressman too rashly proceeds in a given circumstance it is a Congressman too rashly proceeds in a given circumstance it is

March, 1953

RIGHT HAND OPERATION FROM FRONT OR REAR!

An Exclusive Feature



CVEL No. 12 CUTTER AND TOOL GRINDER

Rear lever gives operator convenient right hand control. This feature, plus ball bearing table ways, reduces fatigue . . . saves time and effort . . . pleases operators. . . . increases output.



No. 12 sharpens all types of cutting tools. Readily adaptable to both internal and external grinding.

WRITE FOR — BULLETIN MT-33

Builders of Precision Grinders for 79 Years PROMPT DELIVERY FOR DEFENSE

OVEL PRECISION GRINDERS

DRILL GRINDERS — UNIVERSAL CUTTER & TOOL GRINDERS —
HYDRAULIC & HAND FEED SURFACE GRINDERS

very likely that the clients of rural electrification in his area will be alerted against him. It is well known that the power of the Bureau of Reclamation in several Western areas prevented the re-election of men who had protested against the autocratic manner in which that agency functioned. And there is the classic example of the member of Congress who determined to cut the Department of Agriculture down to size. He became the Secretary of Agriculture. He set to work to clean house. He found he could make no headway against the opposition of those who were supposed to be his subordinates. It is in the Department of Ariculture that they have an Agency which boasts it can reach, influentially, any farmer in the United States within thirty-six hours. Incidentally, that Secretary of Agriculture made his losing fight for something under a year. Then he resigned, and frankly acknowledged that he was defeated. He could not lick the Bureaucrats.

Those who know the substance and the machinery of the Federal Government will tell you, seriously, that we now have four parts of Government instead of the original three set up by the Constitution. They point out that we have the Legislative, the Judicial, the Executive and now the Bureaucratic. And never for a moment doubt that the Bureaucratic is not at least equal to all the others. As a matter of fact, the Bureaucratic part of Government not only is probably the most powerful, but it is that part of Government which functions continuously regardless of who is in the White House or who is in

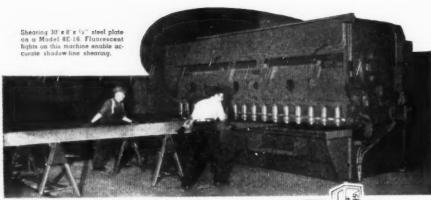
Congress. In a sense, it is a law unto itself.

Do not for a moment believe these people are dishonest or are unpatriotic. They are sincere and they think they are giving helpful service. Over 91% of the 2,500,000-plus personnel of the Federal Government are protected by Civil Service. This means it is almost impossible to separate them from their jobs except for some criminal violation of the law. Moreover, they are protected by twenty-three American Federation of Labor unions, by one huge independent union which is known as the National Federal Employees Organization, and by others totaling

something like forty groups and organizations.

This huge Bureaucracy had its inception in the career man. Thirty or so years ago men and women entered Government employ and adopted it as a career. Highly trained people went into the Department of Agriculture, others went into the State Department, some went into the Department of Commerce. Every Department and Agency was thus gradually built around the career people. They were highly intelligent, rather devoted to the idea of anonymity, and served very faithfully. They realized the continuity of the functions of Government was in their But as the products of the schools which taught the custody. principles of social change came into the Government organization the concept of the meaning of the Constitution, and the purpose of the Federal Government, gradually changed. With this realization of power, the Bureaucrats more frequently resisted other parts of Government, especially the Congress. About the same time that the Executive Order came into general use with the full effect of an enacted law the Bureaucrats would refuse to comply with the orders or direction of the Congress. They declined to testify at hearings. They refused to perform certain acts, or to supply records. They set themselves up as judge, jury and advocates of their own acts.

March, 1953



Smooth, Accurate Shearing Aids Warner & Swasey Gradall Production

A Steelweld Pivoted Blade Shear cuts all the plate used in the manufacture of Warner & Swasey's Gradall Multi-Purpose Earth-Moving Machines.

Because of the simple Micro-Set knife clearance adjustment it produces clean, sharp cuts to close tolerances in various thickness metals ranging from light gauge to $^{1}z^{\alpha}$

The motor-driven back gauge is very popular with the operators because of the ease and speed with which it can be set. Simply by pushing buttons at the middle front of the machine and reading a dial which records to 1.64 inch, the gauge is quickly positioned exactly as required.

Steelweld Shears and Gradalls are alike in many respects: Heavy all-welded construction — Many new and revolutionary features — Entirely different in operating principle from other similar-purpose machines. Both speed the work and cut costs.

If you work with metal plate of any kind, you should have the facts on Steelweld Shears. A Steelweld representative will be glad to call on you at your convenience.

Gradalls are made by the Gradall Division of The Warner & Swasey Company.

Dial and control buttons conveniently located at middle front of shear for setting motor-driven back gauge





GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Professely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
5236 East 282nd Street Wickliffe, Ohio

STEELWELD PIVOTED SHEARS

Was Business



Government-owned Machine Tools

The Weekly Staff Report to the Members of the House Small Business Committee had this to say about machine tools: "The Committee is investigating a number of complaints received from both prime and sub-contractors on the distribution of Governmentowned machine tools. Since assuming control of these idle machine tools on May 12, 1952, the NPA Production Equipment Central Inventory group has listed more than 34,000 tools with additional equipment reported weekly. The Center has allocated a total of 10,477 tools and issued shipping instructions for 3,197 units in its program to lease equipment to direct military and defense-supporting contractors who have been hard pressed to complete production schedules because of a critical equipment shortage.

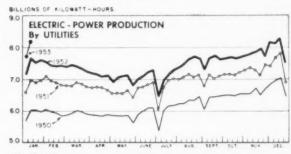
"The Center estimates that only 25% of the tools catalogued can be regarded as modern production equipment, with the remainder classified as obsolete, special purpose items, or in poor condition.

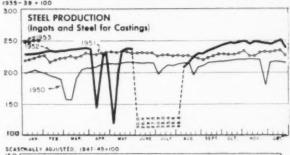
"Much of the interest in this equipment pool has come from small firms. Al-

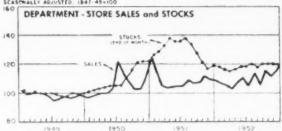
though many have received satisfactory assistance, reports from small business men indicate that a number of small subcontractors have found it virtually impossible to satisfy legitimate needs because

General Business indicators

source: U. S. Dept. of Commerce







of complex administrative procedures. Others have found that the shipping and reconditioning costs which they must bear are prohibitive in view of the fact that the equipment must be returned after completion of the work for which it was procured."

PANTOGRAPHY

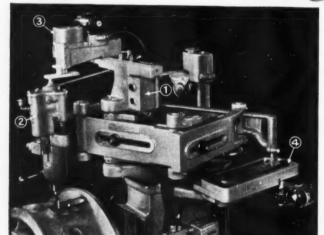
Solves Complex Profiling Problems with Automatic Cutting Cycle

PROBLEM: Profiling eight ports in outside portion of aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic.

SOLUTION: Gorton P-32 Pantomill profiles all eight ports at the rate of 2.3 minutes per port. Cutting cycle is automatic; indexing is manual.

This is truly a power-driven tracercontrol job that would require hours if done by a combination of other methods.





Here's How It Works

Complete cutting cycle begins when "start" button is pressed.

Air cylinder automatically feeds cutter down to cutting position. Cam-operated spindle down feed then takes over. Upon completion of cut and after spindle retracts, this air cylinder further retracts cutter for clearance.

Speed of spindle down feed during cutting is controlled by cam through a Variac.

Motorized chaindriven master starts automatically when "start" button is pressed.

This is just one of many Gorton tracer-controlled production short-cuts which might save you time and money. For complete information, clip and mail the coupon now.

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GORTO	N
MACHINE	CO.
1403 Racine St., Racine,	Wis., U. S. A.

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A LL		*********				**********
Addre	55		*******	************		
City.	State	**********				

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British vs. U.S. Production

The British Productivity Council published the report of fitteen specialists from the British Metalworking machine tool industry who came to the United States in the fall of 1951 to examine United States machine tool industry methods and its high rate of productivity.

They found no outstanding differences between the machine tool industries of Great Britain and the United States. They concluded, however, that "productivity in the American industry is, on the average, higher than the productivity in the British industry."

To overcome the British industry's lag, the team suggested less window dressing of products by placing greater emphasis on function rather than appearance; reduction of costs by applying simple statistical control to the

amount of inspection; use of softer cast iron for the general run of machine tool castings, and greater cooperation between managements to permit more inter-works visits by foremen and production engineers.

Industrial Production

The end of the year witnessed no slackening of industrial activity; in fact, November and December combined showed an advance of 7% over a year ago. For 1952 the production was practically equal to that of 1951. The steel strike prevented a moderate gain in 1952.

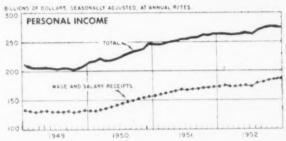
All indications point to a continuance of high industrial production. Production schedules are being increased for automobiles, household appliances, power equipment and machinery. More uncertain are defense orders. They are affected by "stretch-outs," design changes, and changing factors in procurement needs and techniques.

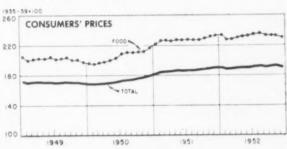
Small Business Doing O.K.

The U. S. Chamber of Commerce recently concluded a study of small business: Small

General Business indicators

source: U. S. Dept. of Commerce





Business, Its Role and Its Problems. Small business is doing all right, the study reveals. Contrary to beliefs, blg business is not eating its small neighbors; instead, big business appears to be shrinking.

There is a high casualty rate among new business ventures. The first five years are the hardest. According to sampling figures, nearly 9 out of 10 businesses failed due to inefficient management.

Small Defense Plants Administration Location of Regional and Branch Offices in the United States

Atlanta Regional Office

(Covering Tenn., S.C., Fla., Miss., Ala., Ga.) 50 Whitehall St., SW., Rm. 316 Atlanta 2, Georgia

Baltimore Branch Office

307 Calvert Building Baltimore, Maryland

Boston Regional Office

(Covering all New England states) 40 Broad Street Boston, Massachusetts



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Index of new orders and shipments of machine tools

source: National Machine Tool Builders Association

Month	Domestic	Foreign	Shipments	Demonstrated Production Rate
January	347.8	33.6	266.6	18.1 - 1
February	318.8	14.4	279.6	17.1 - 1
March	324.3	23.3	299.5	15.7 - 1
April	293.5	15.6	307.9	14.8 - 1
May	284.6	31.4	323.0	13.6 - 1
June	342.9	20.3	330.8	12.6 - 1
July	374.6	14.9	257.2	12.6 - 1
August	309.1	22.7	314.8	12.4 - 1
September	302.4	23.1	368.6	11.8 - 1
October	243.3	22.5	338.2	11.1 - 1
November	205.4	14.3	342.5	10.3 - 1
December	p.222.5	p.19.8	p.354.2	p. 9.8 - 1

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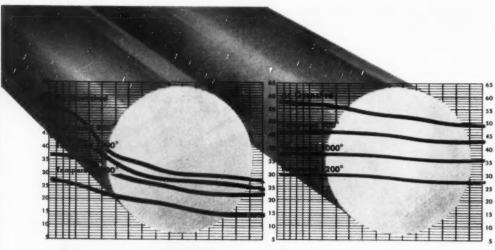
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Some Interesting Operations at Oliver's Crawler Tractor Plant

SEVERAL MONTHS ago I spent a pleasant day at the Oliver Corporation's Cleveland tractor plant, of which Reber C. Stupp is the plant manager and Leonard Ogle personnel manager. This Cleveland plant, like all Oliver plants, is highly efficient, depending for its production on new equipment and original tooling ideas, all helped materially by some ingenious shop hints which the workers have perfected.

Latest piece of equipment which really slashed costs and upped production was a large Fitchburg milling machine, with the help of which machining time on a transmission case was reduced from 2.6 hours and two machines to 45 minutes and one machine. There are several interesting aspects to this operation.

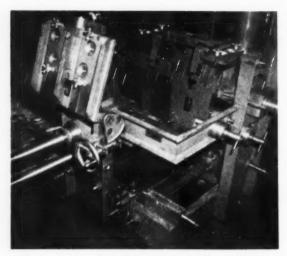
The part is a large transmission case for one of the larger Oliver tractors. The part goes first to a targeting fixture and a radial drill. The fixture is shown in figure 1. Note that the fixture rests on the floor and not on the drilling machine table. This is because there are two fixtures, enabling the radial to drill two operations without



by William F. Schleicher

having to move the fixture. The part is raised and lowered by air hoist and is positioned in jig on four locating buttons, which are built into the fixture. Approximately 25 adapters line up rough bore holes to assure cleaning up in subsequent boring operations. In the past, one danger on the machining of this part was that frequently insufficient metal was left around the rough holes for the boring operation, and, inasmuch as this happened after a long and expensive milling operation (under the old method of milling), the danger was real and costly.

The radial drills eight holes in the transmission case for locating on the



1. A view of the targeting fixture used in conjunction with a radial drill. The transmission case is located on four buttons, two of which are visible in the photograph. The radial drills eight holes for subsequent locating on the milling machine.

milling machine. The holes are 1-9/64" and 7/8" in diameter. It is important that these locating holes be accurate, for the milling operation for all subsequent machining operations on this part is located off the milled surfaces.

In figure 1, two of the four buttons on which the case rests can be seen. A few adapters are also visible. One of the bushing plates is raised while the other is lowered in position, showing the guide holes for the radial drilling operation.

The Milling Operation

After the radial drilling operation, where locating holes were drilled, the case goes to the Fitchburg mill, one of the new pieces of equipment found in the Oliver plant. The mill has six heads cutting simultaneously, cutters being 18" carbide-tipped face mills. Five sides of the transmission case are milled. In the first operation the top and two sides are milled, the case is then turned, and on the second operation the front and back are handled. It will be noticed, in figure 2, that the cutters interlock. All controls are automatic. Operation is through limit switches.

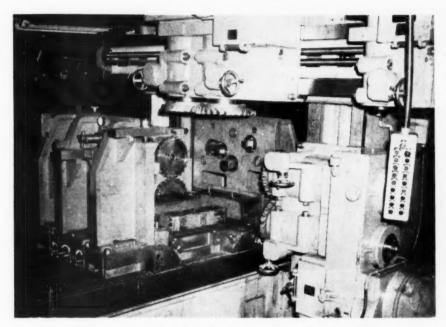
The milling machine removes 1/4" to 5/16" of metal at 10" per minute feed. The speed for the top is 52 r.p.m. and on the side and back is 59 r.p.m. The part is a steel casting and Brinnells at 187.

An idea of the economy of this new machine can be gained from the fact that this mill requires 45 minutes for three cuts as against the 2.6 hours and two machines of the old method.

Automatic Lathe

Figure 3 shows a Sundstrand No. 10 automatic lathe used for turning retainers. Operations on this lathe are: turn O.D., face, and chamfer sides. Production is 620 pieces per shift. An air collet is used to chuck the work; loading and unloading is the only manual operation on this machine. The machine revolves at 606 r.p.m.

This is a roughing and finishing operation. On the roughing operation, as much as 1/8" of stock, although generally only 1/16" of stock, is removed. The finishing operation removes .015". A tolerance of .001" is maintained. It is difficult to arrive at a stock removal figure because of the large variety of retainers made at Oliver.



2. This is the new Fitchburg milling machine which machines five sides of a transmission case in 45 minutes. Previous method required two machines and 2.6 hours to machine the same case. Cutters are 18" carbide-tipped face mills. Six heads machine each case twice, once for the top and two sides, and once for the front and back.

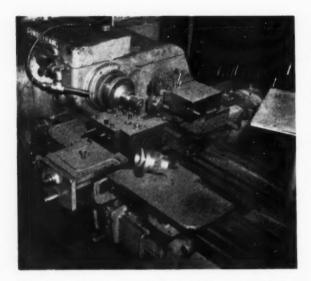
Carbide inserts are used successfully. Approximately 3,550 pieces are obtained before the carbides are reground. Reason for this is that as one point of the carbide insert is worn, the insert is turned slightly and a new, sharp edge is presented to the work. Before all the faces of the insert have become dulled, 3,550 retainers are machined.

Some Interesting Ideas

The suggestion plan secretary for Oliver's Cleveland plant is El Gentry, who showed me some interesting gimmicks. One was constructed on a Foote-Burt continuous broaching machine. This machine broaches tractor links. The broaching stations are so set up that one accommodates right-

hand links and the other, left-hand links. A problem connected with this was that as the finished links came off the machine, they fell into a pan and another worker had to sort out the left- and right-hand links. This problem was overcome by the construction of a fishtail, figure 4. As the links are broached, the station trips a hydraulic switch which operates an air piston which actuates the tail and throws the parts either to the right or to the left, depending on the link.

A mirror is constructed above the fishtail so that the operator, stationed at the front, or loading, end of the machine, can see the tail in operation. This visibility prevents pileups, etc.



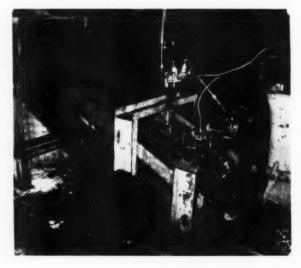
3. The Sundstrand automatic lathe which machines 620 retainers each shift. Carbide inserts are used for greater efficiency. Approximately 3,550 parts are machined on this automatic lathe before the carbides need regrinding. A large variety of retainers are made by Oliver.

The front of the broaching machine can be seen in figure 5

The operator on a model 6 DSE Potter & Johnson turret lathe has a safety feature which is interesting. The lathe machine covers approximately 2½ to 3 feet in diameter. Inasmuch as the

controls are located to the left of the chuck and the operator stands to the right of the chuck for clearer work visibility, there was a safety hazard involved in shutting off the machine if the work should become disengaged or other trouble necessitated a fast shut-

4. The fishtail on the broaching machine. As the parts slide off the broach after completion of the broaching cycle, the fin swings the parts either to the right or to the left, depending on whether the links are left or right. The fin is operated by a hookup with the broaching station.





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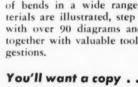
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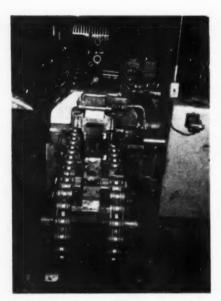












5. Front of the broaching machine showing the loading of tractor links. The fin, located at the end of the machine, is not visible from the operator's position except by means of a mirror, not shown in the photograph.

ting down of the machine. To overcome the danger of running past the
work to shut off the machine, the operator suggested building a foot switch,
which is located to the right of the machine. The foot switch is no more than
a button which is depressed by foot.
A sheet metal guard covers the button so that it cannot be stepped on
accidentally. The operator must shove
his foot under the cover and then depress the foot switch.

While emergencies are relatively rare on this machine, management, very safety-conscious, tries to prevent accidents from occurring.

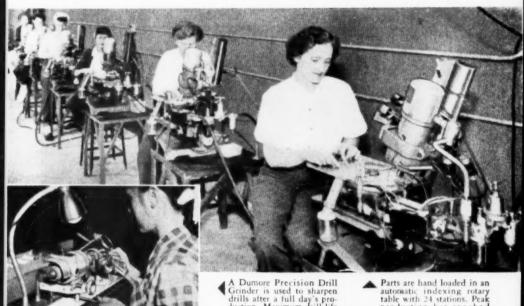
In the inspection department, one of the inspectors made his work considerably easier by a very simple method. He had a Brown & Sharpe checking fixture which was used to check runout on large circular parts. These parts have to be mounted between two centers. The tailstock center retracted by a handle located at the end of the tailstock. The operator would retract the tailstock center while another operator mounted the part. It always required two operators to mount a part for checking. To overcome this, the inspector attached a piece of wire to the handle of the tailstock center and led it down to a foot treadle. Now, whenever he mounts a piece, he merely steps on the treadle, which pulls the wire down, and in so doing the wire bends the handle downward, which retracts the center for easy loading. Now only one man is required to mount a piece for checking.

The tool grinding department has its own quota of ideas. They used a metalbonded wheel to grind chip breakers in carbide tools. But because the wheel was too hard, they used to break the carbide. They mounted a piece of rubber pad under the vise which held the carbide tool. This provided enough "give" so that the metal-bonded wheel could be used effectively. It is claimed they get the advantages of a resinbonded wheel without the cost of a resin-bonded wheel.

The End

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Using special equipment and skills, forms are accurately developed and reproduced on cutter teeth to assure consistent duplication and accuracy in successive cuts. Cutters are projected 50 to 100 times size against engineering layouts to check exact tolerances. Accuracy of form is maintained the full length of the teeth and indexing of teeth is held to close tolerance, allowing the cutters to be sharpened accurately on automatic sharpening machines.

Many times, a series of cuts can be combined into a single combination-form cutter. As an example, several surfaces on these turbine blades are cut with a single cutter. The special cutter form controls accuracy, finish, and form automatically, making the job easier for the operator and reducing the cost per piece.

DESIGNERS OF STANDARD AND SPECIAL

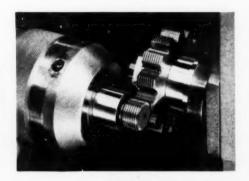
Barber-Colman FORMED CUTTERS

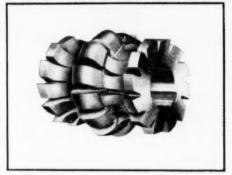
ACCURATE UNGROUND CUTTERS

New standards of production accuracy are available with unground form-relieved cutters because of special engineering techniques and heat treating methods. A change in tool design on this class 3 thread milling job, has cut tool costs and improved the set-up. Barber-Colman engineers designed unground shell type cutters with larger diameter and greater number of teeth to replace ground shank type cutters previously in use. The new design provides class 3 accuracy on ½".46 threads and improves the cutting action with a rigid, short-coupled drive.

These Barber-Colman ganged formed cutters hold exact form limits on contour of 3 lobe supercharger rotors, maintaining high production and tool life. Form on each lobe is held within .003" at a radius of 1.160". Production is 30 minutes floor-to-floor per rotor, 50 rotors per sharpening.

These typical jobs are evidence that special formrelieved cutters can aid you on many of your complicated milling problems. Cutter efficiency of this type is possible with tools engineered-for-the-job. Try Barber-Colman form-relieved cutters on your next production milling problem and experience the satisfaction of having fewer operations, simplified tooling, faster production and trouble-free machining. Send us blue-prints and sample parts for analysis and quotation.





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Barber-Colman Company

METAL CUTTING TOOLS SINCE SOOR

Wet Blasting for Precision Surfacing and Finishing Operations

By **Eugen F.** Anderson, Special Engineer, American Wheelabrator & Equipment Corp.

WET ABRASIVE BLASTING has been making possible some rather important savings where cleaning, surfacing, and finishing of precision-built parts are required. Although it was long thought that only manual methods involving the use of papers, wheels, or stones offered close enough abrasion control to be used on such close tolerance parts as molds and dies, tools, engine parts, gears, etc., it has been found that better control over surface quality and the dimensional characteristics of the work can be maintained with wet blasting than with manual methods, and wet blasting saves many hours of time which formerly were needed when manual methods were employed.

Wet blasting is a process in which very fine mesh abrasives in a water suspension are thrown at high velocity upon the work, but since abrasives ranging from 80 to 2500 mesh are used, depending upon the application, sharp corners and edges or lines in patterns are neither altered nor destroyed. Parts with knurling can be blasted clean without the points becoming dulled.

One application in which wet blasting has enjoyed tremendous popularity is scale removal. Pastic molds, rubber molds, forging dies, die casting dies, and other forming dies must be cleaned of their heat treat scale before they can be put into service, and they must be periodically redressed to remove the carbonaceous deposits and other contaminants which collect on the forming faces during molding operations.

Wet blasting has eliminated much of this manual work, although with molds or dies upon which a mirror finish is



Interior view of blasting compartment equipped for heavy work. Car and work table can be moved out onto rinse tank via tracks.

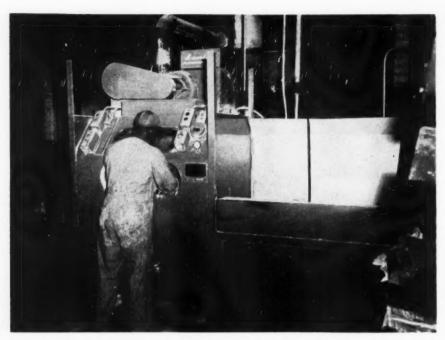
required, a few steps of manual polishing are required after the wet blasting operation. However, wet blasting leaves a perfectly uniform matte-type surface, and with most tool marks, grinding lines, and other surface imperfections blended out by it, a lustre quickly comes up with a little hand polishing. Certain dies can be used with no subsequent hand polishing being performed on them at all.

A manufacturer of plastics molds reported that the removal of heat treat scale from a set of 16 punches used in molding electrical range switch bases was done in seven minutes per piece with wet blasting, whereas it formerly took two hours of manual time per piece to remove the scale by means of emery paper and stones.

A minimum time saving of 10% over

the use of polishing papers was experienced by a die caster. Whereas he was troubled with flow marks, shiny spots, and cold spots on the castings when the dies were paper-polished, these casting defects have been eliminated with the present method of cleaning, and the dies are used for molding without any further surfacing treatment being given.

With such close abrasion control available, most forming dies are finished as much as possible right after hubbing or machining is completed and before cleaning, as it is unnecessary to leave any extra metal to compensate for the wet blasting operation. After the mold or die has been hardened, the scale is blasted off, and the mirror finish, if required, is put on manually. Tolerances during blasting are kept



Exterior view of Liquamatte wet blasting machine at Perfection Tool & Metal Heat Treating Company, Chicago, Ill. Power rinse tank is visible at right.

within .0001" where necessary, and lines or lettering in the mold patterns remain unchanged. What is more important, in the case of plastics or glass container molds the dimensions of the cavities remain within specifications, so the molded product is of the correct volume.

Similar advantages are found in removing the heat treat scale from such work as parts for metal cutting dies, or forging punches for ordnance shells. One job consisting of 17 identical 1"x 1½"x1½" die inserts for a metal-cutting die had the surfacing time after heat treating reduced over 5 hours, due to this process of scale removal. Cleaning of the punch inserts was reduced 10 hours, for a total saving of 15 hours or 80% of former requirements. This

die maker formerly polished the scale off, because grinding the scale, although a faster method, sometimes produced surface cracks on hardened materials.

Much manual work has been saved in the production of micro-finishes. One manufacturing concern needing a number 4 micro finish on some metal punches found that it could be obtained by grinding the rough machined pieces after heat treating, then wet blasting them. The punches after wet blasting had the correct finish, and precision dimensions were retained without trouble.

In the manufacture of parts such as gears, blasting is being done for removing fine wire burrs and heat treat scale, improving the appearance of gears, and improving the lubricant-retention qualities of the teeth. Of interest to the

Tiny holes? Easy!

Accurate holes? Easy!

Holes on production schedules? Easy!

Tiny, accurate holes on production schedules? . . . WOW!



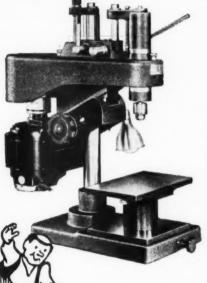


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For light-weight work such as tools, no work conveyor is needed, but simple fixture may be employed, as is the case with this broach.

sales department is the feature that the process gives gears a beautiful light color which materially improves their sales appeal. One prominent gear manufacturer gives his hardened gear and spline combinations, about 8" long and 3½" in diameter, around 5 minutes blast per piece.

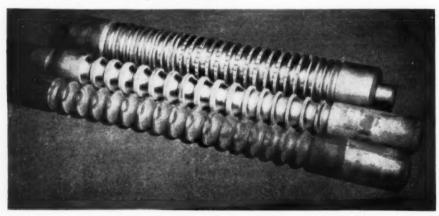
Precision cleaning in maintenance

Many precision cleaning problems are presented in maintenance applications. Probably the more frequently encountered is the reconditioning of molds, dies, etc., where scale due to carbonaceous lubricants and high temperatures needs to be removed from the face of the parts. Wet blasting has become popular for this work not only because of its speed, but because inspection of the dies and molds is made easier. Heat checks and similar defects often are disguised by metal smeared by manual polishing, so that the defects in the dies are not discovered until defective moldings are made from them, with considerable expense in wasted material and labor.

Where dies and molds need to be repaired extensively, wet blasted dies are usually preferred because matte surfaces do not reflect light as do mirror surfaces and workmen experience less fatigue with them.

In the case of forging dies, it some-

Broaches in three stages during plating process. The one at the front is a used broach to be reconditioned. Only degreasing has been performed. Middle broach has been plated. The one at the rear has been plated and wet blasted and is ready to be put back into use. Blasting after plating gives a surface that holds lubricants well all over from the minute the tool is put into service.





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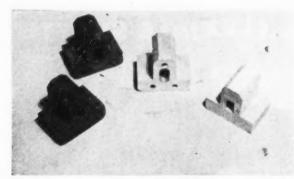
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View of die inserts for metal-cutting die. The two at the left are in scale-coated condition after hardening, but the two at the right have been completely de-scaled in less than 5 minutes of wet blasting per part with 325 mesh abrasive.

times happens that the top areas of a cavity become burred from impact so that they are narrower than the hollows of the cavity. In this case, grinding of the burred part is indicated, followed by some metal replacement process. Wet blasting is excellent as preparation for the addition of metal, since the matte surface imparted has more area for a strong metal-to-metal bond.

Maintenance of plant equipment

For reconditioning parts like pistons, piston rings, valves, etc., from plant engines, burners in oil furnaces, and

a wide variety of other parts, wet blasting has been extensively employed. One large plant uses a wet blast machine in spare time for such work. Carbon is removed from plugged oil burners in only ten minutes per burner in a typical job, whereas with manual scraping and similar methods, it formerly was necessary to spend hours of time. Feed pipes of burners which were hard to reach with manual tools are cleaned as well as the outsides of the parts.

In some installations, where heater units are used for the abrasive slurry,

Cleaning heat treat scale from these forged ord-nance shell knockouts, sized 7½" in height by 3¼" diameter, is done in 20 minutes per part at one plant.



5 MINUTES PER PIECE WITH THIS VERSATILE NEW HMILLING MACHINE



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Investigate the versatile new CH line of milling machines. Their features are job proven to give you cost-cutting results plus greater productivity, better finished products. Contact our nearest representative or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wis.

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Greater cutting efficiency - design refinements in 3-bearing spindle, a heavy duty, special forged steel gear.



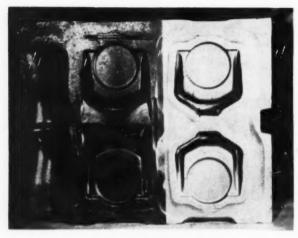


Smoother feed performonce, heavy duty 2" dia. table feed screw. 23% more bearing contact between screw nut.

Speed range changes from 25 to 1500 rpm, Extra-wide feed range-16 changes from 1/4 to 32 ipm.







and certain other accessories are employed, it has been found that pistons and other parts of plant equipment need not undergo such thorough degreasing before they are subjected to wet blast cleaning.

Surfacing in tool plating

Wet blasting has played an important part in the plating of tools. Plating shops find it advantageous to wet blast tools both before and after plating. Blasting before plating removes any fine wire burrs and leaves a matte surface which has more area than a perfectly smooth surface and therefore affords a stronger plate-to-metal bond. Burr removal at this stage prevents the possibility of their becoming plated and later stripping off when the tool is put into use, taking the plating with them. Another advantage of wet blasting prior to plating is to minimize directional lines left on the teeth. If these are left untouched, the plate assumes those same lines, and lubrication is more difficult when the tool is put into use.

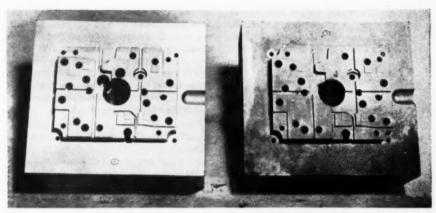
Wet blasting after plating improves the appearance of the tool, and also imView of forging die showing effects of wet blasting. To make closer surface comparison possible, rusty half at left was masked off during blasting. Half at right was cleaned as shown in two minutes, 8 seconds with 140 QZ Liquabrasive.

Close-up of the cleaned section of forging die. Note how inspection is improved by wet blasting. Heat checks in the die are apparent, showing that this die cannot be returned to service. Thorough inspection at this point saves time and labor spent in producing work that would be imperfect or out of tolerance.



proves lubricant-retention properties. Lubricating oil has a tendency to bead up on a freshly-plated tool, but the matte surface imparted by wet blasting holds lubricants well all over the surface, and the "break-in" period normally experienced with new tools is virtually eliminated.

One tool plater adopted the wet blasting process to replace wire brush-



Comparison view showing how heat treat scale can be removed from plastic mold parts. These cores are sized 4" x $4\frac{1}{2}$ " x $1\frac{-3}{4}$ ". The one at the right is in the scale-coated condition following hardening, but the one at the left was cleaned as shown in only 7 minutes' time with 325 NE Liquabrasive. This meant an approximately 95% saying in scale removal time.

ing. This made it possible to mount several tools on a fixture and blast them in rapid succession, so 5 or 6 drills, for example, could be surfaced in the time formerly needed to wire brush only one. Surfacing the tools for better lubricant-retention properties after plating was, in effect, a bonus, because he was unable to do that at all with his former method.

The process

The wet blasting operation is done in metal cabinets of various designs, depending upon the requirements of the work. The cabinets range in size from small bench models accommodating one workman to large floor models over 6 ft. in length and accommodating two workmen at once. For general work, however, a cabinet about 4 ft. in length by 3 ft. in width, accommodating one operator, is most popular, because, while it is compact enough not to take up a great deal of area, it has a sufficiently large blasting compartment to accommodate parts around 32" x 24" in size and in the vicinity of 1,000 pounds in weight.

The abrasive in the slurry is kept in suspension by either a pump or compressed air and propelled at the work through a gun by means of compressed



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WRITE TODAY FOR DETAILED LITERATURE

QUEEN CITY MACHINE TOOL CO. 235 E. 2nd Street, Cincinnati 2, Ohio air at a pressure of 80 to 100 p.s.i. The trend has recently been toward vertical centrifugal pumps for slurry agitation and recirculation, since they have been found to require only ½ H.P. as compared with 2 to 5 H.P. for compressed air, and they require virtually none of the maintenance required by horizontal-type pumps.

During the blasting operation, the operator stands outside of the cabinet with his arms extended through armholes on the front of the machine and manipulates the gun and work inside the machine with his hands, while operating the compressed air valve with his knee. The abrasive gun is held approximately 1½ to 2" from the work and at an angle of around 60° with it. The workman is able to view the progress of his work through a vision window.

Work is inserted into the cabinet and removed from it through doors on the ends. However, with small work, such as tools, gears, small molds or die parts. or small engine parts like valves, the operator can save himself a considerable amount of time by simply inserting and removing them through the armholes, if they are constructed so that the gloves he wears are unattached to the gauntlets. Unattached gloves have been more popular than attached gloves for this reason, as well as for reasons of health, since it is possible for each workman to have his own pair of gloves for avoiding contagious skin diseases.

The work conveyor inside the machine depends upon the requirements of the job. Where only small work which can be easily lifted and turned by hand is customarily cleaned, no work conveyor at all is employed. An expanded metal floor in the blasting compartment serves as a work platform, and the operator turns the work over by hand. Where a large number of a particular small part is to be

handled, a simple fixture for rotating the part in the blast is sometimes employed. Where heavier work such as dies and molds are to be cleaned, the cabinet is provided with tracks and a work car which runs on them. This car is usually equipped with some sort of a rotating turntable to facilitate manipulating the work in front of the gun.

After blasting, rinsing of the work follows. Ferrous parts are rinsed in inhibited water. Hand rinse tanks are sufficient for light-weight work, but for heavy molds and dies, or similar work, power rinse tanks are available which have tracks on which the work car can be drawn out from the blasting compartment. The tank is filled with water and inhibitor, and a coolant type pump raises the water through a hose. Power rinse tanks are convenient when chain hoists and other lifting devices are needed for loading

heavy and bulky work. In any type of rinsing, immersion-type water heaters are desirable, as the parts dry faster when the water is hot, and there is less chance of oxidation of the metal.

Special types of abrasives and chemicals are needed for the process, but because of the popularity of wet blasting, it is now possible to obtain all sizes of the various types needed, plus the necessary rust inhibitors and antipacking chemicals, directly from manufacturers' stocks. Considerable research has been done for determining which type and size of abrasive should be used for particular applications. Table 1 shows suggested abrasives for certain applications, but special problems require special treatment, so it is best to submit any kind of work to a manufacturer's demonstration laboratory where the correct abrasive requirements can be determined by actual test. Among the wet blast chemicals



The abrasive sizes indicated below are customarily used for the cleaning and finishing applications listed. Individual finishing problems differ in characteristics, however, so in any application, it is advisable to have tests performed in a manufacturer's demonstration laboratory for determining the best size for the case in question.

Table 1: Customary Abrasive Usage

Drawing dies	1250 or 325 mesh
Extrusion dies	1258 or 325 mesh
Glass molds	1250 or 325 mesh
Die casting dies	325 or 1250 mesh
Forging dies	140 mesh
Plastic molds	1250 mesh
Rubber molds	325 or 140 mesh
General cleaning for inspection	1250 mesh
Tool prior to and after plating	325 or 1250 mesh
Light deburring applications	1250 or 325 or 140 mesh
Metal cutting dies and stamping dies	1250 or 325 mesh
Reconditioning of pistons, piston rings	325 mesh
General maintenance cleaning of plant equipment	325 or 140 mesh

which are available is a new liquidtype inhibitor for easy dispersion into solution. It has the advantage that parts rinsed in water treated with it dry virtually without water stains.

Since wet blasting equipment has been in existence for several years, the more recent improvements have been in phases other than in the process, itself. The elimination of certain maintenance problems has been given much attention. One development of this work has been the trend toward using inverted V-shaped tracks for the work car because abrasive washes off

rather than piling up, and the car is more free-acting. Gauntlets have undergone redesign to make them drip-proof. Hopper drainage has been made easier and more thorough. Fluorescent lights have been used so that abrasive would not bake onto the light well and impair vision. Platforms for the operator to stand on have been made unnecessary with some machines, and "push button" starting and stopping have been developed to save much waste time in the machine's operation.

The End



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How Chevrolet Oil Manifolds Are Fabricated

By Herbert Chase

OIL MANIFOLDS constitute an exceptional feature of Chevrolet engines and are produced in exceedingly large volume by Rochester Products Division, General Motors Corporation, from welded steel tubing that is manufactured from ribbon steel in the same plant. Both major components are of ½-inch dia and all are terne coated, partly to facilitate the soldering that follows assembly of what is commonly referred to as "the rake," because, in appearance, it bears some resemblance to such an implement.

Except for two small stamped clips, shown with other components and an assembly in figure 1, all parts of the manifold are made from tubing. Both of the largest parts are cut to length in Yoder cutoff machines and the length that remains straight then goes to a crank press. There, a die, equipped with six pointed punches, pierces six holes, all in one straight line. In the same operation, the die produces crimplike depressions at each side of each hole and these help to extrude collars outward around the punches. Sub-

sequently, when the jet tubes (or "rake teeth") are inserted, the collars help to strengthen the joints at the inner ends of these short tubes.

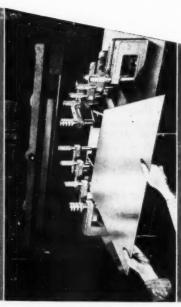
Another press die then shears out a portion near the center of the tube where the main feed pipe is later applied. Then the tubes go into the air operated press, figure 2, which is fitted with a drum-like indexing die or tube holder having a series of longitudinal recesses. A tube is placed by hand in each recess as it is indexed just above the front position. Then the tube is indexed automatically through three working stations where the air operated punches extrude a collar around the center hole in each tube. Further indexing permits the tubes to fall out of the die and drop into a chute ready for the next operation.

Feed pipes that conduct oil to the straight tube in the final assembly are cut to length and then are formed to a C-shape in a hydraulic bender, figure 3. After forming, each length is placed

Lengths cut from welded steel tubing undergo forming, piercing and other operations before being assembled and soldered in fast setups.



Showing Wales Type "BL". Hole Punching and Type "N" Notching Units in a combination press brake setup for punching and notching mild steel up to 1/8" THICK.



A stamping press setup of Wales Type "CJ" Hole Punching Units for punching mild steel up to 1/4"

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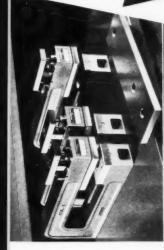
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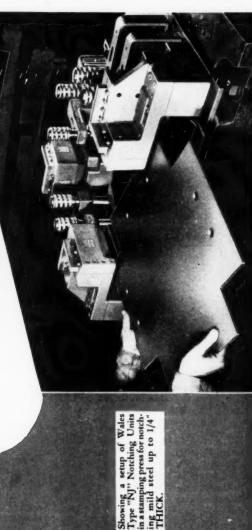
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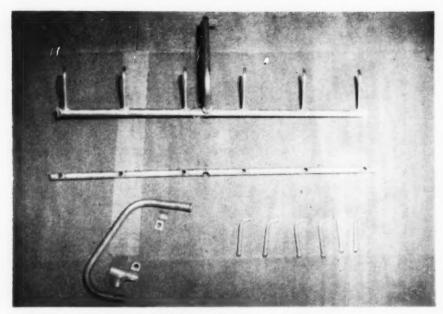
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THICK.



1. Above, a completed oil manifold for a Chevrolet engine and (below) the components from which it is fabricated. Both the parts and the assemblies are manufactured by Rochester Products Division, General Motors Corporation.

in a press die that strikes both ends. In this operation, one end is flared and the other is notched to fit the collar at the hole where the feed pipe and main pipe join.

Feed tubes are next placed in the dial fixture, figure 4, where the oil pan pipe clip is soldered in place. As the tubes are put in place, a clip and a pre-cut slug of solder wire are placed in the holding fixtures, all of which rotate slowly but continuously. As the tubes are advanced, the clip portions pass under a series of gas flames that heat the tubes and clips and cause the solder to melt and run into the joints. Further rotation permits cooling and the soldered assemblies are removed just before new parts are added at loading stations.

Jet tubes are made from short

lengths of ¼-inch welded tube. Each has one end formed to an angle of about 60 deg. with the axis, this end also being swedged to about 7/32-inch dia. and cut off at an angle to form a spout. Near the other end, an outward flange or collar is formed by collapsing a short length of tube in a die. When jets are assembled to the main tube, this collar rests against the extruded collar at the hole and a 3/16-inch length of the small tube slips inside the collar.

Jet tubes are placed in main tube hole by girls who apply one jet with each hand, after dipping its collar end in soldering flux, and face the spouts all in the same direction. This is done with the tube in a channel track that leads to a die in a press. When the die closes, the extruded collars on the large



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2. Air-operated press with indexing drum. Punches extrude a collar at the central hole where the feed pipe is to join the straight tube of the manifold.

tube are closed in around the shanks of the jet tubes and hold the tubes in place. Solder is subsequently applied to strengthen these joints and to make them tight.

A stamped clip, resembling half a pipe T, is also pressed in place in the die to strengthen the joint where the feed pipe (also added to the assembly before the die closes) joins the main tube of the manifold. The T-clip has an ear, with a pierced hole, that forms one supporting point when the manifold is later assembled in the oil pan of the engine.

For major soldering operations, the manifold goes, next, to the soldering machine. There, each "rake" is set in a fixture of which there is a series carried on a chain-like conveyor.

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MECHANICAL SHAPERS-stroke lengths $16\sqrt[3]{4}$, $20\sqrt[3]{3}$, $26\sqrt[5]{6}$. Six rates of speeds with normal motor, 12 with two-speed motor. Accelerated return motion. Single lever control within easy reach of operator. Swivel work table can be set to either side at any angle up to 90° .

FULLY HYDRAULIC MODELS—stroke lengths 26", 33½", 39½". Infinitely variable ram speeds with quick return and minimum power consumption. Central operator control panel. Tool holder with graduated scale swivels 45° to either side. Self-acting downfeed of tool slide. Automatic tool lifting device available.



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 Hydraulic bender in which feed tubes are formed to "C" shape.

"Rakes" are thus advanced through soldering flux and then through gas flames that bring the joints to be soldered up to soldering temperature.

Each rake is held with jet tubes vertical and, after fluxing and heating, each joint is brought in contact with a jet of molten solder. Most of the solder drops back into the molten bath below

but enough enters each joint to make the joint secure. Jets are fed at low pressure from a pump and there is little spattering. Any excess solder is removed by passage under rotary brushes that cause the excess to fall back into the bath, which is automatically held at fixed temperature.

Jets of solder are used because they



4. Rotating dial carrying fixtures each of which holds a C-shape feed pipe and a stamped clip that is soldered to it. A slug of solder placed at each joint is melted and runs into the joint when heat is applied by gas flames.

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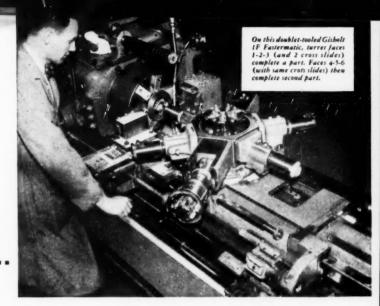
can be directed to the points where the solder is needed and do not waste solder at other points. After the solder is in place and excess is removed, the assemblies pass through a water spray to cool them. Then they are removed from the fixtures at the discharge end of the machine. Fixtures are returned overhead to the loading station by the chain, for repeated use.

Assemblies are then transferred to a press having a die that pinches each end of the main tube, after which these ends are sealed by a dip first in flux and then in molten solder. Finally, every assembly is placed in a test fixture and oil is fed through to be sure that the jet spouts direct the oil jets as specifications require. This completes the processing except for applying air to blow out oil prior to shipment.

The End



"We regret that, due to unforeseen technical difficulties, we will be unable to hold our scheduled unveiling of the new model." HOW
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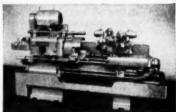
doubled production!

The time and unit cost for machining these cast iron pulley flanges were cut in half when the Fastermatic with double tooling took over the job.

Just three turret faces were needed to complete the machining and threading on each part. Therefore, tooling is repeated on the other three turret faces so that two parts are finished with each revolution of the turret. Production is doubled over the old method . . . time lag is cut to a minimum . . . there's twice the time between tool changes.

This smart setup illustrates one of the many ways Fastermatic Automatic Turret Lathes give you greater efficiency and lower costs on a broad range of jobs. And one operator can usually handle two or more machines. Ask for the facts. 00

Floor-to-floor time for these pulley flanges is down to 1.75 minutes. Duplicate tools and collapsing taps on the turrer rough and finish the bore, chamfer and cut threads. Front and rear slides shave the angle and form the radius on the O.P.



Gisholt 1F Fastermatic Automatic Turret Lathe

GISHOLT MACHINE COMPANY

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Drawing Cartridge Cases with

New Horizontal Hydraulic Press

MANUFACTURERS OF cartridge cases have the double problem of manufacturing cases in volume quantities while meeting rigid ordnance specifications at the same time. Cartridge cases must conform to exacting standards of accuracy in order to be sure of perfect function in the field.

Rheem Manufacturing Company undertook the job of producing 90 mm. cartridge cases faster and better in a mechanized manufacturing setup with streamlined material flow, and a minimum of handling and human effort. Assisting Rheem with the problem of press equipment for this plant, Clearing Machine Corporation of Chicago designed special presses for cartridge case production.

Clearing engineers proposed a new kind of hydraulic press for the cupping and drawing operations. These presses have certain inherent advantages over equipment conventionally used for shell case manufacture. A press drawing a shell to a final length of twenty-four inches requires an unusually long stroke. The long return stroke necessarily slows down the total stroke time.

A way of reducing this lost time is to produce at both ends of the stroke, eliminating lost motion from operating time. The Double End press does just this and has a number of other advantages which fitted in with Rheem's plans.

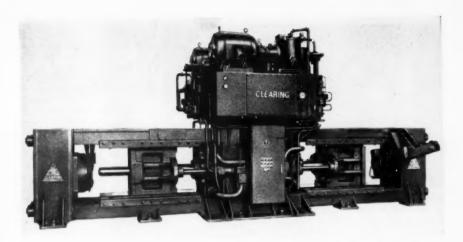
In terms of potential production, these presses can be installed at a lower original investment than conventional equipment. The Double End press requires less manufacturing space than two conventional presses, especially where ceiling height is a factor. Conveyorized material handling arrangements are more easily adapted to them.

Installation is a relatively simple matter. No foundation pits are required.

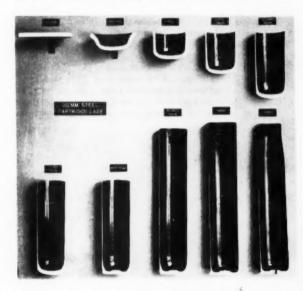
The Manufacturing Process

Starting with a disc of 1030 steel .69" thick and 8%" in diameter, a series of press and auxiliary operations converts these heavy discs into a slender shell case, 24 inches long.

The first operation performed on



The Clearing Double End Hydraulic Horizontal Press. This press produces at both ends of the stroke and takes the lost motion out of press work. The press is equipped with special automatic feeds, specifically designed for handling cartridge cases.



Pictured here are the steps required to convert a steel disc .69 inches thick and 8% inches in diameter into a slim streamlined 90 mm. cartridge case 24 inches long. All the drawing, including cupping and tapering operations, were performed on Clearing Hydraulic Horizontal Double End presses. The pre-head and head operations were done on twin 2000-ton Clearing Hydraulic Vertical Presses.

Operations on a typical case are, top row, left to right: blank, pre-cup, first draw, second draw; bottom row, left to right: third draw, pre-head, fourth draw, head, taper;



In this view the operator is loading the feeding chute with first draw parts. The second draw requires 100 tons, reducing the area by about 4 percent and wall thickness approximately 44 percent. This Clearing Double End press operates automatically as long as parts are available in the chute.

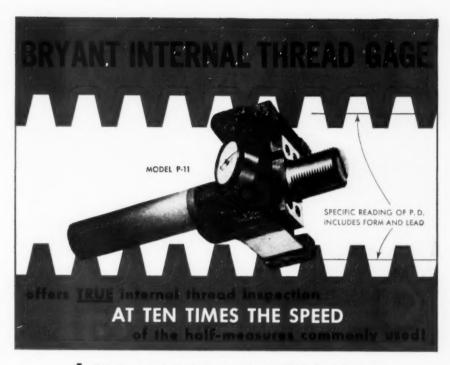
This 2,000-ton hydraulic Clearing press is used by Rheem Manufacturing for preheading the steel cartridge cases. The hydraulically driven, two-station dial feed speeds loading and unloading. When a case is loaded and in position, the dial automatically rotates to the center of the press. 1350 tons are required for the preheading operation.

Double End presses is cupping. Here, the part is forced through a carbide insert draw ring which reduces the wall thickness by approximately 44 per cent. Approximately 265 tons are required for this operation. On the opposite end of the same press, parts go through the first draw operation, reducing the wall thickness another 45



Interesting features are these built-in safety limit switches on this 2,000-ton preheading press. The limit switches make certain that the cases are positioned properly on the heading post. The case must strike the bottom finger switch as the loading dial rotates. If the case hits the top finger switch, the press will not stroke.





The P-11 gives a single dial indicator reading in .0005", of variation from basic size of P. D., form and lead. Interchangeable segments inspect all classes of threads from 5/16" to 5" dia. Pressure on the thumb lever collapses the pair of segments allowing swift engagement of the threads. This 14 oz. portable gage is designed for use in the shop or at the inspection bench. Descriptive literature on this and other Bryant gages is available on request. Send coupon today.

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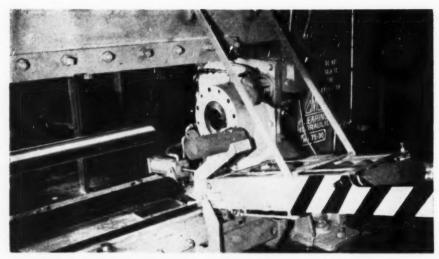
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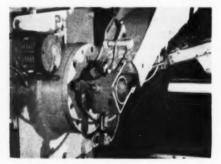
On this draw, the feeding device has been changed to hold down the length of the press. Parts are loaded into a chute but they are lifted into position by pneumatic paws, instead of sliding in front of the dies; this reduces the length of the punch stroke, and thus the length of the press.

per cent. Double End presses perform three more drawing operations and a tapering operation to bring the case to its finished shape.

The base of the cartridge case is formed in two heading operations on 2,000-ton Clearing hydraulic presses. The pre-heading and heading presses are each equipped with rotating dials on the bed. These dials swing 180 degrees, allowing the operator to load the drawn part on the heading post at the front of the press. The post with its

piece-part moves into position under the heading dies automatically in conjunction with the press stroke. Safety limit switches on these presses make certain that the case is properly positioned on the heading post before the press will operate.

The complete picture of the manufacturing operation at Rheem's New Orleans plant shows a balanced operation. Each press is an integrated unit of the entire coordinated effort. The press line was planned in relation to



Close-up showing one of the unique feeding devices that are built into the Clearing Double End Presses. Parts are fed into the press through the chute. The chute aligns the parts in a position to receive the punch. Pneumatically operated paws hold the parts in the chute until the punch returns to starting position. When the part is properly aligned, it engages a limit switch that permits the punch to operate.

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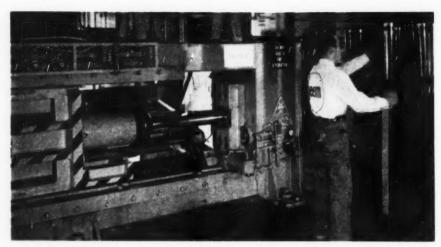


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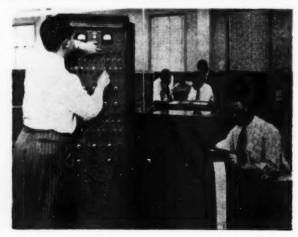


A nearly completed case is positioned here in the tapering dies. The unloading platform, normally used on this double end press, has been removed to show the dies. 90 tons are required for the tapering operation. The ejector is a 25-ton hydraulic unit built into the slide. As the punch returns the ejector is activated and the piece is removed from the post.

the entire operation. Each press has the correct automatic feed specifically adapted to the press's function. The problem was not merely one of designing a group of presses, but of planning an entire production setup.

Computer speeds mathematical calculations at Reliance

Front views of new Analog computer installed on new Euclid plant of Reliance Electric & Eng. Co., Cleveland, Ohio, to speed up mathematical calculations on electric motor desian and performance. Because involved mathematical computations can be performed electronically in a fraction of the time required by ordinary means, the saving in manhours is tremendous, and especially so when more than one solution to a problem needs to be explored.



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Cross-Hole Drilling Jig for Shafts

A JOB which occurs frequently in the majority of engineering structures is the drilling of holes across the diameters of shafts or rods. Pins driven through the holes form an effective holding means for pulleys, gears, collars and the like and can often be made to act as a cheap substitute for keys and keyways. The basic principles of drilling a hole across a shaft are the same whatever the diameters of either element: There must be provided a method of holding the shaft and some means for guiding the drill. Bearing these two requirements in mind, it is reasonable to suggest that some form of universal jig can be designed for drilling cross-holes in a wide range of shaft sizes.

Universal jigs for cross-hole drilling have been produced in many forms but have generally suffered from the defect that the designer tried to cover too wide a range of shaft and hole sizes thus making the jig awkward to use.

One manufacturer has a wide range of product sizes which incorporate cross-drilled shafts in their construction, and it was decided to produce a drilling jig which would cater for all the hole and shaft sizes likely to arise in the component range required. It

By Tom Brown

was found that shaft diameters ranged from %" to 1½" and the hole diameters required were 16 in number and ranged from ½" to %" in increments of approximately 1/64". With these requirements in mind, the drilling jig illustrated was designed.

One important feature of the jig is that there are no loose parts to be misplaced. Another is that the jig is ready for immediate use and can be employed profitably on production drilling or for one-off jobs, with little or no adjustment and setting.

The 16 different hole sizes are catered for by means of a set of hardened headless drill bushings A which are pressed into an annular ring B so that their center-lines are placed radially. An-





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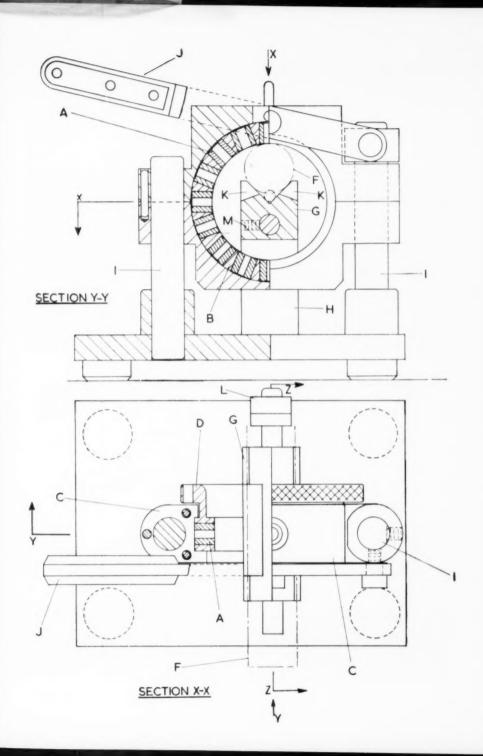
nular ring **B** is rotatably mounted in an internal groove machined in the split housing **C**. The section of the ring can be seen from **Section X-X** and it will be seen to have a sideways extending portion **D** which is knurled on the exterior.

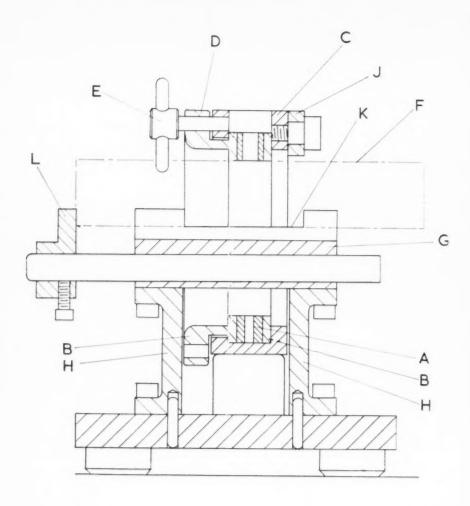
Knurling of the extended portion D enables the ring to be rotated in the split housing so that the drill bushing which it is required to use can be indexed into the working position at the top of the jig. The face of the portion D carries 16 holes, whose centers intersect those of the drill bushings, at a right angle, and these holes are engaged by the indexing pin E which locks the ring to the housing (Section Z-Z). Adjacent to each indexing hole is marked the size of the drill bushing with which it is associated. From the foregoing it will be clear that the drilling of, for example, a 38" diameter hole requires the jig user to locate the indexing hole with this size indicated and rotate the ring until the hole is at the top, when the indexing pin can be inserted to lock it in position. This represents the only preliminary operation required when drilling different components.

Work location (F) is accomplished by means of the V-block G. From Section Z-Z this will be seen to be positioned at the approximate axis of the annular ring and passing therethrough, where it is supported in position by means of the blocks H. The blocks are dowelled and bolted to the V-block and to the base plate upon which the

iig is assembled.

Clamping of the work to the V-block is accomplished in a very simple manner. The housing, which supports the ring of bushings, is slidably mounted upon the vertical pillars I upon which it can be moved by means of the simple lever J. Pressing downward of the lever forces the ring into contact with the top surface of the work, which is held in place while the hole is being drilled. The clamping effect produced by this procedure is of a light character but is sufficient to prevent the work from shifting since the force required to hold a circular bar in a V-block is very small. In fact, it is a common practice to

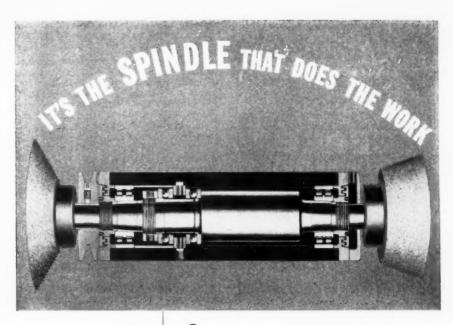




SECTION Z-Z

drill cross-holes in shafts which are located in V-blocks without any clamping of any kind; the drilling pressure holds the work in place automatically.

Clamping the work in the manner explained above has the advantage that there are no screw-operated clamps to be manipulated; a single movement of the lever is all that is necessary. A further advantage of the method is that the bottom end of the drill guide bushing is as close as possible to the work. This assures accurate diametral positioning of the hole in the shaft and





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reduces the risk of the drill wandering out of place when presented to the curved surface of the work.

In order to allow the inner surface of the ring to make contact with shafts of small diameter, the V-block is cut away at both sides as indicated at K in Section Y-Y. This clearance removes some of the locating area of the V-block, but for long shafts, for which the jig was designed, it is not detri-mental. Shafts over 1" diameter can span the clearance gap and rest on the ends of the block which extend either side of the vertically sliding housing. Short shafts below 1" diameter can rest in the remaining portion of the V. left after the clearance has been machined away, and will be fully supported therein. All the standard components for which the jig was designed are longer than the V-block so that all diameters are supported fully. It is only when a shaft shorter than the V-block and over 1" diameter has to be drilled that the clearance gap proves awkward. Such short shafts are only encountered on one-off jobs.

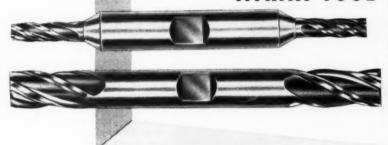
For production work a length stop L is provided and is mounted upon a horizontal shaft which can slide in a hole drilled longitudinally in the V-block, A set screw M locks the shaft at any desired position.

This jig is not particularly cheap to make, but its universal application to shaft cross-hole drilling makes the expense of its manufacture worthwhile, and it will never become obsolete. The entire jig is made from steel with the vertical pillars, V-block, and annular ring all case-hardened to resist wear. The drill bushings are standard purchasable products and can be renewed, when worn oversize, by pressing them out of their holes in the ring.

The End

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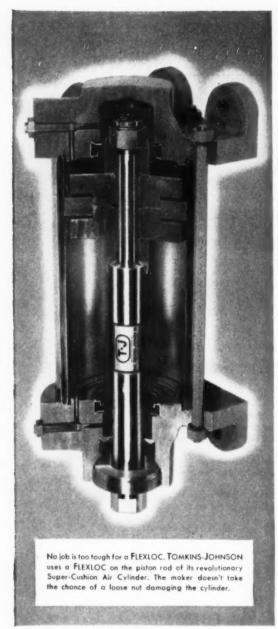
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How many countless times has this cry been uttered by foremen all over the country? Even today, when many foremen adhere to the principles of modern dynamic supervision, the feeling is widespread that some workers are simply too stupid to be integrated into an efficient industrial team.

Now it is true that some men are just naturally slower mentally than others and therefore often cause their foremen trouble. They don't take instructions well, because they don't easily understand them. They make mistakes because of poor judgment and not because of any faulty "teaching" on the foreman's part. They often

indirectly weaken shop discipline by becoming the objects of all kinds of practical jokes and snide cracks by the



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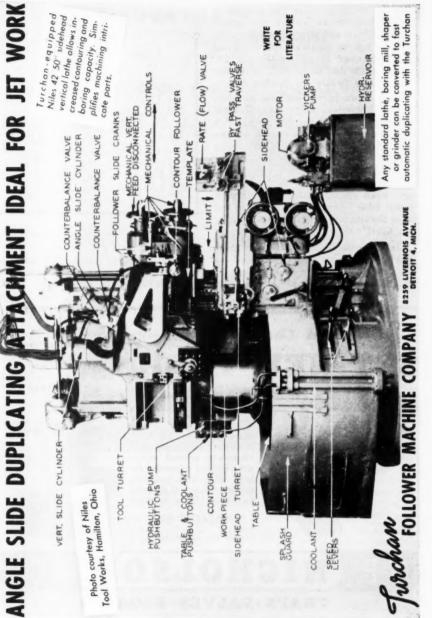


other men. The fact still remains, however, that whether these workers have a demoralizing effect or make a positive contribution to the plant depends not on their IQ rating, but on what kind of supervisory attitude they face on the job.

Let's take the hypothetical case of Gus. Gus is a more-or-less ordinary fellow distinguished only by an obvious touch of mental sluggishness. He is by no means a Mongolian idiot, but he is a little slow. He finds it hard to adjust to new situations or new job methods, but he is a pleasant fellow who tries hard and manifests a lot of tenacious company loyalty.

We have said that the kind of worker Gus becomes depends primarily on his foreman; now let's see how Gus makes out under two different men.

First we have Angelo. Angelo has participated in many foreman training programs and is aware of the importance of good human relations in the plant. He tries very hard to get along with Gus, but it is beginning to look like a losing battle. Angelo has man-



aged to keep from losing his temper over the many blunders Gus invariably makes, because he knows that going along with an erring worker often gets you the results you want. However, as Gus continues fouling things up. Angelo really has to struggle to remain patient, and finally the bubble bursts.

"Now listen here. Gus." he screams. "I don't know how many times I've got to tell you how to do this job. If I've told you once. I've gone over it a hundred times, and you're still not doing it right. You ought to be ashamed of yourself; the other boys can follow all my instructions all right, and you can't even do this little job right the fourth time around. Now listen to me for a change and get it right this time. vou hear!"

Clearly something has gone wrong. Why? Angelo certainly has tried to work things out. He's been patient in situations where other men would have

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blown their stacks. Why has this disrupting blow-up occurred?

Because Angelo misdirected his good intentions. He meant well, but he put the cart before the horse, so to speak.

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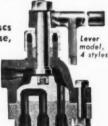
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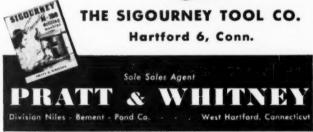
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His patience came to the fore after Gus blundered. Angelo actually was tolerating the mistakes Gus made and wasn't focusing his attention on the crux of the whole matter—Gus' inability to think fast in an emergency or to take new instructions well. He was violating the important principle of modern supervision which states that it is all right to be tolerant of people, but not of the mistakes they make.

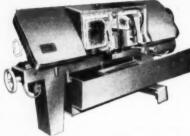
Let's see how foreman Frank would handle the situation. At the outset, Frank would recognize that Gus could not be expected to do as much original thinking as the other men. He would see that Gus needed closer supervision and more careful training, but he would not for a minute expect more mistakes from Gus than from the others. He would properly assume that if Gus received the proper supervision, he

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would be as valuable and trustworthy a member of the plant team as anyone else.

So what does Frank actually do? First, he takes extra time and effort to more thoroughly explain job procedures to Gus. He exercises his patience at this point, not (as Angelo did) after mistakes occur. He assumes a questioning attitude to find how much Gus knows and doesn't know. He explains slowly and in detail, and he repeats

himself when he thinks it necessary. He asks Gus to tell him in his own words how he is going to do the work as a final means of determining whether the fellow has really understood his instructions.

He avoids at all costs putting Gus on jobs that do require quick thinking and the making of on-the-spot decisions. He does this simply as part of the normal process of fitting the right man to the right job.





You'll go far toward eliminating coolant troubles on your machines when you specify Gusher Coolant Pumps. Gushers are precision built! All rotating parts are electronically balanced. Maintenance costs are cut to a minimum. Illustrated is a Model 325 Cleereman Four Spindle Drilling Machine with a Model UL-2106 Ruthman Gusher Coolant Pump.

MACHINERY CO. CINCINNATI, OHIO

1816 READING ROAD

He shows that he respects Gus as an individual and frowns upon the kidding of any of his men to too great an extent in the shop. He looks for other strong points in Gus, and (as in most similar situations) he finds many desirable characteristics that some of the other men lack. He finds that Gus is punctual and regular, that he works hard and long without complaining, that he is an enthusiastic salesman of the company's virtues beyond the plant walls and working hours.

The result of this kind of supervisory attitude is that Gus does his job well, despite his mental slowness. He infests the shop with a lot of good-natured enthusiasm. He errs no more than the other men, and he thus honestly earns their respect as well as that of foreman Frank. In short, for Angelo, Gus is a worker problem of the first magnitude;



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is your guarantee
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performance
... backed by
102 years
experience in
the manufacture
of the world's
finest chucks.



See your Distributor for a complete line of chucks by Horton — pioneer in 3-Type chucks for jet ongine machining



THE E. HORTON & SON CO.

under Frank's understanding supervision he becomes a productive and happy cog in the industrial machine.

There is no justification for "giving up" on any worker simply because he is mentally slow. In the first place, terming a man "a dumb dodo who'll never learn" is too often just a convenient excuse for failure on the foreman's part to solve a human relations problem. And in the second place, even if the foreman really means that a man is a little slow on the trigger, it is his job to better understand and more carefully supervise the man and thus make him a valuable member of the plant team. Take your cue from foreman Frank; it will pay off.

The End



"Please, Mr. Jones, I didn't reproach you for your shortcomings."

Gerald E. Smart, a plant engineer at Allis-Chalmers' Norwood (Ohio) works since January, 1951, has been placed in charge of the plant engineering department there.



"Darling, Dad says our elopement is almost as economical as his



No. 935-2 QUICK CHANGE GEAR TURRET LATHE 11" Swing, 1" Collet Capacity, 11% Spindle Hole, 431/4" Bed

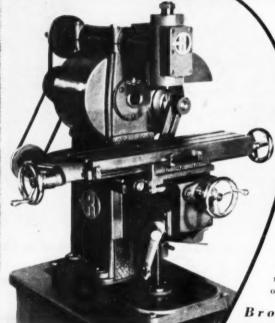
Logan LATHES!"

NO OTHER LATHE of comparable specifications can match the Logan in economy. The Logan is quickly set up for every type of lathe operation. The lasting accuracy that results from advanced design and rugged, overall construction keeps production at peak efficiency and holds costs down. For example, the Logan ball bearing spindle needs no adjustment for any speed from 45 to 1500 rpm, a feature that assures sustained spindle accuracy and saves maintenance. Self-lubricating bronze bearings protect vital points against wear and prolong service life. With its 11" swing and 1" collet capacity, the Logan can bring precision with economy to most of your lathe operations. Write for the Logan Catalog.

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New Rotex Bench Mill provides 12" long, 9" vertical and 5" traverse on its 5" x 20" table surface . . . 2 remarkably high degree of table surface utilization!

Heavy work ordinarily requiring larger, expensive mills is readily accomplished on this extremely rigid, low cost bench mill. The large diameter spindle supplied with a No. 10 B&S or No. 4 Morse taper and operating at 15 separate spindle speeds is equipped with large Timken bearings. Dovetail type ways are hand scraped. Milling of T slots from solid insures inflexible anchoring of work. Power feed is .003, .006 or .012 per spindle revolution. Available with or without motor or accessories.

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GLENCO Floating Tool Holders

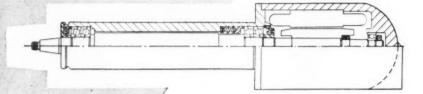
No fine adjustments necessary. These holders correct misalignment to 1/32" radius AS THEY TURN. They've been saving set-up and tool change time on screw machines, drill presses and lathes for over 20 years. Are you using them fully in all departments? Might pay to check!

THE J. C. G L E N Z E R CO. Inc.

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Whitnon leads the way with PRECISION BALANCED SURFACE GRINDER SPINDLES





Inquiries regarding standard or special Spindles for grinding, milling, boring and drilling operations' receive immediate attention

special Heavily spring preloaded to keep spindle radially and axially rigid.—

Stock Spindles are one full horse power, 3600 RPM enclosed motor, 220/440 volts, sealed in lubrication.—Sparks out fast leaving an excellent finish.—The only spindle rigid enough for crush dressing and perfect contour grinding.—Constant adjustment from spring preload keeps spindle rigid regardless of wear or temperature change.

—Spindles stocked for #2 Brown & Sharpe, Do All, Hammond, Norton, Reid, Taft-Pierce, and others. Improve your present surface grinders by equipping them with Whitnon spindles.



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NEW BRITAIN, CONN.

How to Keep Your Hydraulic Oil Lines Fireproof

Courtesy: Ransom Tyler, The Oilgear Company

A close investigation into fire causes in die casting plants, foundries and some machine shops will frequently show the cause to have been the result of inadequate piping design, careless repairs or neglect.

If your system is already installed perhaps it requires a critical inspection. Maybe there are dangerous spots which can be corrected without great effort.

1. Loose, vibrating pipes are a hazard. These are almost sure to break due to work hardening of the metal. Copper pipe is especially vulnerable to vibration and if used at all in the danger area, it should be only for low pressures (under, perhaps, 300 psi) and where the piping is well protected against vibration.

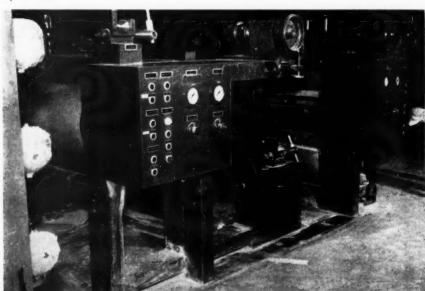
2. Flexible hose should be looked at very critically. Its use in dangerous

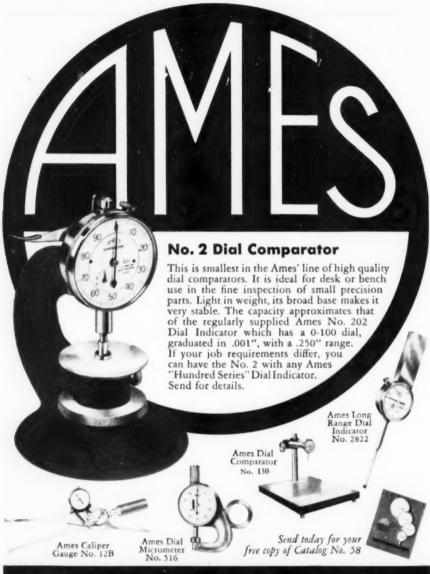
areas can be hazardous as it is subject to sudden failure, either by rupture of its wall or by blowing out from its coupling. The use of flexible hose can usually be avoided by telescoping joints, rotary joints, or, if the hose is used only to provide flexibility for adjustment, by two or more unions which may be loosened when the adjustment is to be made. If the machine is of such a design that flexible hose cannot be eliminated, perhaps the hose can be enclosed in a box or shroud which can be vented to the sump or waste pit.

3. Observe the location of small, fragile piping. If it is in a location where it can be walked on, run over, or used as a ladder, it should be moved or protected by adequate guards.

 Guard against make-shift repairs.
 Piping changes are often made on a temporary basis using unsuitable ma-

1. Control panels and front of machine piping. Note that the adjusting valves are fully enclosed. Piping is carried down to the floor trench thru the rectangular raceways. Electrical and hydraulic controls are mounted in the same panel but are separated by a wall.





Representatives in B. C. AMES CO. 28 Ames Street principal cities. B. C. AMES CO. Waltham 54, Mass.

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2. Drive side of machine. The only exposed piping is the short lengths to the three hydraulic motors. These are brought from the compartment thru bulkhead fittings. The valves and piping at the center are covered by a floor plate forming operators' platform.

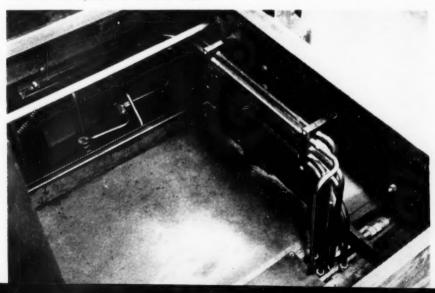
terial such as malleable iron fittings. wrought iron pipe or welded pipe in a high pressure oil line, with the intention that it be replaced later. Such fittings and piping should be replaced now. Sometimes pipes are bent or strained in position either on initial installation or at some later time. Such strains combined with shocks and vibration can easily lead to a serious break. Careless piping practices must not be tolerated in places where oil and fire might mix.

5. Long overhead runs of pipe should be avoided, for any failure in their length will spray a film of oil over wide areas covering perhaps several danger points.

6. When pipes pass through floors or partitions between machines, close the opening through which they pass, preferably with asbestos packing, to prevent flames from reaching from one floor or machine to another.

7. Look especially at the operation of the machine. The oil flow must be smooth and free from shock if the machine, equipment and piping are to continue to function properly, Shock is not essential in the operation of any

3. Close-up of piping under operators' platform. Note the sturdy bracing for the pipes and their arrangement in the floor trench.



ANOTHER Viking "First" No Chip Breaker



Grinding

WITH VIKING V-BACK ADJUSTABLE CHIP BREAKER TURNING TOOLS

SAVE YOUR PRECIOUS DIAMOND WHEELS

Here's how . . .

- Separate chip breaker block and tool tip simultaneously locked in tool holder with one locking device.
- Solid carbide block provides trouble free, long life chip breaker. No chip breaker grooves to grind into the tip each time tool is sharpened.
- "On the job" adjustment of chip breaker to control the chip to meet variations in speeds, feeds, depth of cuts, and material machined.
- Carbide to carbide contact of chip breaker block and tool bit allows no wedging of chip under breaker to fracture the carbide.



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Holders supplied in shank sizes from 3/4" to 2".

Straight turning, 20 degree lead angle, offset and facing tools.

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- 1. Low Initial Cost
- 2. Longer Blade Life
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BLUE BOOK'S Know How Reference Sheets

hydraulic unit. It is introduced by sudden or jerky movements in the operation of the valves or controls. It can usually be eliminated by properly valving the circuit and often, at but small expense, in longer cycle time. If a machine operates as though it were being driven by a hammer, or if pipes have a noticeable shock, it is time that the hydraulic circuit be re-designed and sudden shocks eliminated.

The time and expense involved in correcting bad practices are often recovered many times over in the cost of the fluid which has been retained in the system.

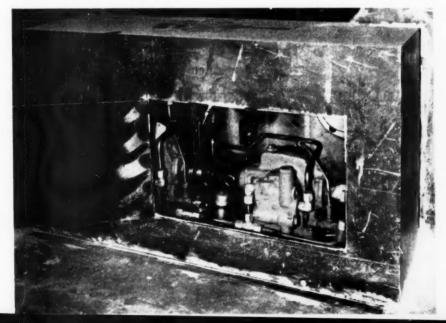
If you have the problem of designing a new, self-contained machine that will be used with molten or hot metal, such as die casting machines or forging presses, all of the points listed above should be kept in mind. But, also, your concern in producing a safe machine should start with the initial design of the oil circuit. Simplicity should be the keynote. The equipment you select should have the aux-

iliary valves and controls built integrally with the fluid-power unit so as to eliminate most of the external piping and fittings. All pilot valves should be enclosed in compartments and all pilot piping should be shrouded in raceways. All the power piping should be of steel with welded, flanged connections to the cylinders. The entire design should avoid inaccessible pockets in which dirt and oil will collect.

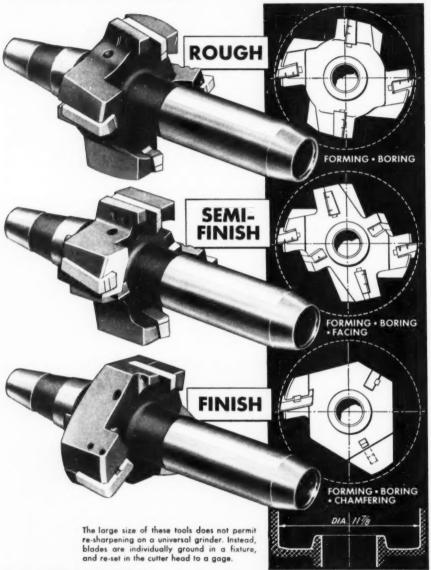
The circuit design should be critically examined for shock. Destructive surges are most easily cured on the drawing board. Particular attention should be paid to return or drain lines, as it is often considered that, since a line is open to the reservoir, or is protected by a low pressure relief valve, it is safe. However, sudden changes in rate of flow can cause very destructive high pressure peaks in such lines.

Good workmanship is also essential in piping. Threads must be sharp and tight; welding must be sound; and, above all, the pipes must fit without being strained into position.

 Pumping units of fully enclosed construction with hinged access doors. Piping is carried to machine thru floor trench.



TOOLING by GAIRING



The GAIRING TOOL COMPANY . 21228 Hoover Road . Detroit 32, Michigan

MODERN TOOLS

Life of Metal Plungers Increased by Hard-Facing

METAL PLUNGERS for molten glass, protected from heat and wear by Colmonoy Spray-welded hard-facing alloy surfaces, are functioning up to 54 times longer than conventional cast iron plungers in the equipment of eight leading American manufacturers of glass containers. The hard-facing alloy is applied by a powder metal spraying unit in a process that provides a non-porous, fusion bonded, wear and heat resistant surface on the plungers up to 0.060 in. thick.

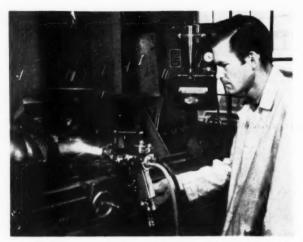
Performance tests on hard-faced glass plungers reveal that they cost as little as one-eighth as much per hour as unprotected cast iron plungers. In addition, much less lubrication is required for plungers, thus avoiding surface contamination in containers, which is often caused by excessive use of lubricants. The alloy surface on the plungers can be renewed easily by respraying and re-fusing when wear occurs after long periods of operation.

The prolonged life of these plungers

By L. V. LaRou, Chief Engineer Wall Colmonoy Corporation

has led to long continuous operation for container manufacturing equipment. Quality of the glass containers has been further improved by smoother inner surfaces resulting from the use of these plungers which retain their smooth surfaces for long periods of time.

No plunger design changes are necessary to apply the Colmonoy Sprayweld process to the hard-facing of conventional glass plungers with the exception that mild steel instead of cast iron is specified as the plunger base l. Applying powdered hard-facing alloy with a Spraywelder pistol to the grit-blasted surface of a glass plunger chucked in an engine lathe. The alloy is mechanically bonded to the plunger in this step.



material. In the first step the plunger surface is undercut to the depth of the overlay. Next, the surface is blasted with steel grit to provide a good mechanical bond between the base metal and alloy that is applied in the subsequent spraying operation. Next, the grit-blasted plungers are chucked in a lathe and rotated while the hard-facing alloy is applied by the pistol, figure 1. A smooth overlay of alloy

can easily be made on the cylindrical plunger within 0.020 in. of finish dimensions.

The mechanically bonded alloy surface is then fused to the plunger base metal by rotating the plunger in the same lathe setup, figure 2, under an oxyacetylene flame. The hard-facing alloy is thus molecularly bonded to the base metal in a non-porous deposit.

Fusion-bonded, hard-faced surfaces



2. Fusing the sprayed-on coat by rotating the plunger in the lathe under the flame of an oxyace-tylene torch. A molecular bond between the alloy and base metal is provided by this operation.



3. Various sizes of metal plungers for molten glass before and after machining with a carbide tool following the Spraywelding of Colmonoy No. 6 alloy to the plunger wear surfaces. The two plungers at the right have not been machined.

of the plungers are machined in a lathe with a carbide tool before installation in the container moulding machine. Various sizes of plungers are shown in figure 3, before and after machining.

To be able to make use of the Spray-welding process, a manufacturer needs, in addition to standard maintenance equipment such as a lathe and grit-blasting machine, only a Spraywelder unit, oxygen and acetylene tanks and a compressed air source for the spray unit capable of delivering 15 cfm of dry air at a minimum pressure of 60 nsi.

Properties of the alloy surface

The Colmonoy No. 6 alloy, which is applied to the glass plungers by the Spraywelding process, has high resistance to oxidation at elevated temperatures as well as remarkable metalwetting properties. It also has what is known as a high plastic range. This means that the alloy is plastic or

"mushy" over a wide range of temperature (1850° F. to 2050° F.), enabling it to be bonded to steels, stainless steels and some cast irons and copper alloys without flowing or losing its shape.

This latter property is of great help in maintaining uniform non-oxidizing alloy overlays on shapes like those of glass plungers.

The alloy has great resistance to wear and corrosion. It will outwear hardened steel by from 5 to 25 times. It resists most acids and all strong alkalies. Its hardness is from 56 to 61 Rockwell C scale.

Until hard-surfacing techniques were applied to glass plungers, the best plunger material from an economic standpoint was cast iron. Although it is possible to bond the No. 6 alloy satisfactorily to some cast irons by Spraywelding, mild steel is now being recommended for the plunger base ma-



4. A Spraywelded plunger, left, after 216 hours of operation compared with a newly Spraywelded plunger, right, ready for operation in a glass container moulding machine.

COLMONOY No.6
HARD FACING
ALLOY SURFACE

A line drawing of a typical plungs

5. A line drawing of a typical plunger for molten glass showing the area that is wear and heat-proofed by hard-facing.

terial for maximum performance and life.

By specifying a mild steel such as SAE 1020 for the plunger material, failures resulting from non-uniformities that often occur in iron castings are avoided and maximum plunger life is assured. According to one leading glass container manufacturer, a mild steel plunger costs only about 10% more to prepare than a similar cast iron type—a cost that is more than offset by the resulting reduction of plunger failure.

Typical plunger performance

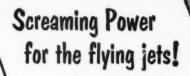
A hard-faced plunger is shown at the left in figure 4 after 216 hours of operation. The containers it produced have no inner surface defects. An unsurfaced plunger in the same machine lasts 5 hours. The hard-faced surface on the plunger can be renewed easily by heating it to a dull red in the lathe spraying setup and following through on the original steps of spraying, fusing and turning with a carbide tool. The plunger at the right in figure 4 is shown as it appears after Spraywelding and machining.

An unprotected cast iron plunger similar to the design shown in the line drawing in figure 5 lasted seven hours in a machine in a West Virginia glass plant. Plunger cost was about \$1.00 per hour. A Spraywelded plunger, figure 5, lasted 185 hours at a cost of about 12 cents per hour.

The End

$25\,\%$ greater average life for dies attributed to guide pin covers

In a comparative survey made recently among a group of the large industrial organizations using Elasticone guide pin covers on their metal forming dies, it was found that 25% greater average life was added to dies equipped with this protective covering, according to a statement issued by Henry D. Gordon, general manager of the Central Safety Equipment Co., Philadelphia,











THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, with face-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Smoothed by GISHOLT BALANCING

Heart of the jet propulsion engine is the high speed impeller (air compression member) which rotates at speeds above 15,000 r.p.m. The impeller must be free from any trace of unbalance, for at such speeds, the slightest vibration is disastrous.

Gisholt DYNETRIC Balancing Machines do the job so well that these ultra high speed rotors spin with an off-center displacement of less than .000025"! They make such a quick, easy and accurate job of it that they are used almost universally for this work.

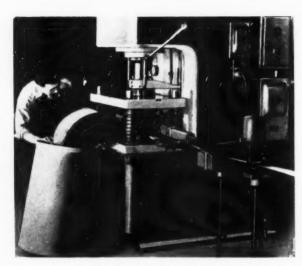
In fact, Gisholt DYNETRIC Balancing can be used to balance anything that rotates—from ½ ounce to 50 tons. Freedom from unbalance vibration means greater safety, less wear, better service—and distinctly longer life.

*Write for free booklet "Static & Dynamic Balancing."

GISHOLT....

Madison 10. Wisconsin

At the rate of 20,000 per day, this 35-ton Multipress produces mop clamps, using a roll-feed and 4-stage progressive dies mounted with Elasticone guide pin covers. Only casual supervision is required for this cost-cutting, all-automatic operation at Stanley Home Products plant East Hampton, Mass.



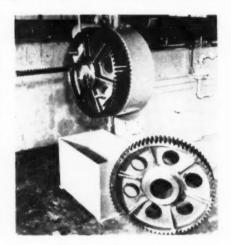
manufacturers of Elasticones.

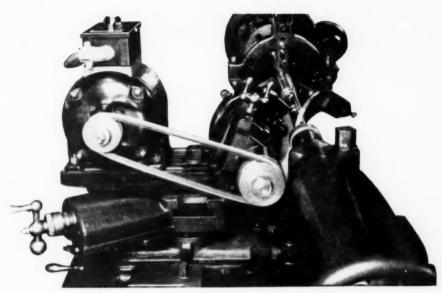
The Elasticone guide pin cover is a spirally wound cone made of specially heat-treated alloy flat steel. Manufactured in a group of stock sizes to accommodate most industrial presses and die sets, it is easily snapped into place over the pins and bushings without the use of tools. It is retained in position by its

inherent spring tension and does not require attachment to the die surface. It functions simply and is self-aligning. As the press opens and closes, the Elasticones move accordingly, its primary purpose being to eliminate the pinch point between the bushings and pins, offering complete protection for the guide pins.

Broaches 54 serrations in tapered gear, sprocket bores

This special equipment, manufactured by the Acme Broach Corp., Milan, Mich., was recently supplied a customer for broaching 54 involute serrations in the tapered bore of large diameter gears and sprockets. It is entirely automatic in operation and after the gear or sprocket has loaded over the work horn and clamped, the broach is inserted through the guide slot and connected into the broach puller and the starting lever thrown. The machine draws the broach through the work part, cutting a single serration parallel to one side of the bore; and when the end of the broach has passed through the work part, a tapered key under the back of the broach is automatically thrown into clearance position so that the broach may be returned through the broached slot with no contact between the





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The symbols in the above equation represent your Lathe and a "HISEY" type 4KX Precision Grinding Head. The answer is truly a precision grinder.

Illustration at left shows the 4KX 1 H. P. Grinder with external grinding head mounted, including 10-inch diameter wheel.

The special internal spindles are interchangeable with the external spindle, permitting a wide range of external, internal and surface grinding operations.

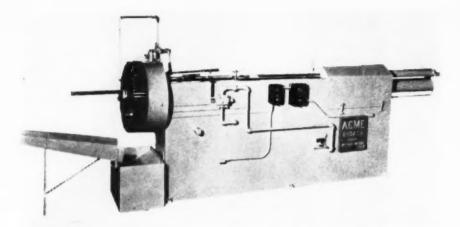
"HISEY" Precision Grinders are furnished from ¼ to 10 H.P. capacity. The V-belt drive affords the most efficient and economical speed; permits rapid changes as required.

They can be mounted on a boring mill, planer and other machine tools for production or tool room work.

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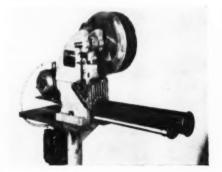
broach and the work part. The machine automatically reverses and the broach is returned back through the work part and immediately, when the first tooth clears the work part, the gear is automatically indexed and locked hydraulically, at which time the machine begins another cutting stroke.

The hydraulic circuit is interlocked so that indexing of the part, as well as cutting and return stroke of the broach, must follow in proper sequence, protecting the operator and the cutting tools. Production time is 15 minutes floor to floor.

Application of Benchmaster Half-Presses to Munitions Manufacture

Punch presses have long been used for the various drawing and forming operations required by the munitions industry, particularly the manufacture of various caliber shell cases. For the most part, high tonnages are required. There exist, however, many jobs in which low tonnage presses would be adequate except for the small shutheight of such machines. Usually conventional presses in the 4-ton range possess approximately 8 inches shutheight—insufficient for the applications illustrated herewith.





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MACHINE and TOOL BLUE BOOK



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If It's Worth Marking—Mark It Well.



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QUICK-CHANGE

Tool-Holders to Drill, Tap and Set Studs, etc., without moving work, or stopping or reversing machine. Individual friction edjustment in each tap-holder, if required.

POSITIVE

For through holes where work is drilled and then re-handled and tapped.

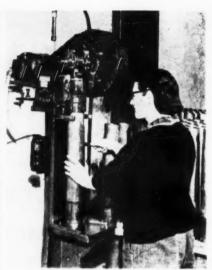
BALL BEARING CONE-DRIVE

Designed for Ball Bearing High Speed Drill Press.

These Tappers may also be adapted for button or acorn die threading.

Write for Complete Information

ERRINGTON Mechanical Laboratory, Inc.



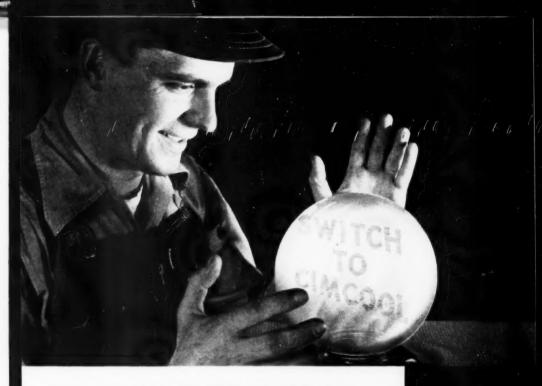
The introduction of the Benchmaster half-press, however, opens an entirely new field for manufacturers. This press consists of the upper half of the press frame, complete with ram, crankshaft, flywheel and the clutch mechanism with its trip lever. The frame is severed below a sturdy reinforcing cross brace between the two column members. This web is easily drilled for bolting the frame to any required base.

Illustrated are two typical applications of the Benchmaster half-press. The first is a set-up for nibbling the ends of the shell cases, rapidly establishing accurate length and smooth trim.

Note the sub-frame upon which the press is bolted. It consists of a casting to which a cylindrically shaped die is attached. The conversion actually amounts to a horn press.

The die is of the same approximate i.d. as the shell cases. It is equipped with a rectangular slot which is mated to the $1^{1/4}$ " x $1^{1}2$ " punch fitted in the ram.

The pilot extension supports the shell case at its outer extremity on the two small rollers. The large roller at the end of the pilot acts as a rotating stop and limits the depth of the shell case when it is slipped over the pilot.



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No wonder metal cutting operators say every day is a lucky day for them when CIMCOOL° is on the job. For this radically new and different coolant makes jobs better . . . and does a better job!

It's crystal-clear why operators call Cimcool the biggest working improvement in years. This revolutionary cutting fluid—this chemical cmulsion—virtually eliminates rancidity and foul odors—even in the hottest weather! Can't burn. Can't smoke. Has no objectionable odor of its own. Doesn't soil hands or clothes and contains no skin irritants. Leaves no hazardous slippery film on the hands, machine, work or floor. And Cimcool cools so fast that tools and chips actually stay cool to the touch.

We predict that one week's run will convince you that Cimcool is far superior to old-fashioned coolants. For a demonstration in one of your own machines, just write us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet "Cimcool Defeats Heat." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

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E GO

OF ALL METAL CUTTING JOBS



The press ram operates continuously at 285 strokes per minute since no clutch is utilized, producing a series of fast nibbling bites. The shell is rotated by hand until a complete revolution has been made. Several hundred cases can be completed per hour and the setup is easily altered for shell case sizes from 75 to 150 mm simply by altering the pilot and die.

Approximately 18" to 36" of metal is removed, either brass or steel measuring .040" in thickness.

The second application shows a Benchmaster half-press converted for a sizing operation. Only a small tonnage is required. The problem for a small press, however, was the tremendous shut height. It has been very simply solved by securing the half-press to a T-section frame. The bed is thus located 18" or more below the punch.

Shell cases come off a tapping machine at the rate of 300 per hour and are fed directly to the sizing press. The cases are manually centered under the



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punch by two V-shaped fixtures, the lever tripped and the punch instantly opening up the necked-down portion of the shell case, establishing the finished I.D. The press is limited in its production by the preceding tapping process—could easily turn out almost a hundred percent more out-put per hour. Where production is unhindered, a similar installation is automatically triggered by a micro-switch, contacted as the shell case is inserted in the fix-

tures. No manual tripping is required and cases are sized as fast as they can be fed.

Honing main bearing bores in V-8 blocks

Accuracy of alignment, roundness and size is generated in the five main bores on new automatic production honing machines designed by the Micromatic Hone Corp. of Detroit, Mich.

Two model 740 Hydrohoners are used by one major automobile manufacturer

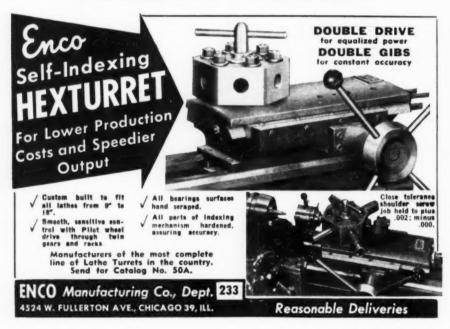


to hone between 60 and 70 blocks per hour. The two machines and the transfer mechanism that brings the blocks to them are interlocked through the automatic Microsize control.

The blocks are taken from the conveyor line, tipped up, and delivered to either of the two machines that are

set facing each other. The automatic transfer mechanism is designed so that the block is delivered to the machine having at the time the least number of blocks on its table. As each block is finished, it is automatically tipped up onto the conveyor line and another block is indexed into the honing position. As the part is automatically located the tool starts rotating, reciprocating, and expanding to hone the five bearing bores in the block. When all bores are "to size" the Microsize control ends the cycle. The tool is collapsed and withdrawn from the bore, the finished block indexed from under the spindle, and another block located in position for honing. The operator never touches the blocks except for spot checking.

The tool has one set of abrasives and seven sets of plastic guides. The abrasives stroke all the bores. The guides stabilize the tool and assure it will follow a true center line and generate accurate bearing surfaces.



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Coated Abrasives Grind Wide Sheets to Precise Thickness

A surface grinder, called the Curtin-Herbert Micro-Grinder, is being manufactured that will face wide web sheets of leather, plastic, felt, cork, rubber or metal, maintaining a thickness tolerance of ± 0.0005 in. on the finished stock. Developed by Curtin-Herbert Co. of Gloversville, N. Y., in co-operation with Behr-Manning Corp. of Troy, N. Y., the machine produces this degree of accu-

racy through the use of a coated abrasive cover, spiral wound on a cast iron back-up roll. Machine widths range from 12 to 80 in, but widths of 40 to 52 in, are standard.

Accuracy of the finished-ground web depends on the hardness of the material to be ground and the amount of the stock to be removed. On relatively soft non-metallics, 0.0625±0.0005 in. of stock

1. Sheet of cork being ground to size in the Micro-Grinder. Webbed stock can be ground to tolerances of ±0.0005 inches. On top of the case of the grinder is shown the suction nozzle that carries grindings out of the machine.





2. Coated abrasive cover being spiral wound onto the cast iron roll. Note that the seams are butted together and are not overlapped. The two large handwheels regulate the thickness of cut as measured by the dial indicator (right center).



WELDED STEEL DESIGN SIMPLIFIES PRODUCTION .. COST ON MACHINE TOOLS

by William B. Boice

Welded Fig. 3 Welder

Boice-Crane Company, Toledo, Ohio

machining operations like milling struction precision tolerances are often held in castings can be eliminated by designing for welded steel construction. On our jointer, for ground to close tolerance in one setup after welded assembly Wherever machining is required, with steel conone cut as compared to rough and finish cuts the top surface is now finish on most castings. example. reguired

made from castings, our jointer would weigh wice as much and still be subject to inaccuracies is needed to resist deflection under load. rienced in the present welded steel construction. deflection and warpage no longer expe-Since steel is twice as rigid as grav from, material from

irder-like struc

With less material, less machining and fitting involved, shop costs are reduced. Furthermore, modern appearance achieved with the welded design has greatly improved selling appeal.

RIPHRITA IN

WELDED DESIGN ALWAYS SAVES STEEL AND LOWERS COST



1. Original construction of pedestal grinder required costly milling and drills ing using heaty machine tool equipment.
Casting had to be filled and painted to
obtain quality finish for sales appeal.



Fig. 2. Present welded steel design. Quality of product and appearance improced to enhance sales appeal. Stability increased to estimate valve appeal. Stability increased by low-ening motor into pedestal have. Weight is cut 55% yet product is more rigid and costs 12% less to produce. Courtery, The Bridgepost Sately Imery Wheel Co., Inc., Bridgepost, Conn.

MORE PROOF

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WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

can be removed in one pass through the grinder. Extremely hard non-metallics, such as mica and laminated phenolic, have been given a 0.030 ± 0.0005 cut at one pass.

The coated abrasive cover is spirally wound around a centrifugally-cast normalized cast iron drum that is machined to a tolerance of ± 0.0005 in. The edges of the coated abrasive cover do not overlap but are butted together. This mounting technique for the drum cover permits utilization of the entire drum periphery.

The cover is secured by a series of clamps that fasten to movable heads on each drum end. These movable heads exert tension on the coated abrasive drum cover outwardly and in the direction of the spiral.

Either an oscillating or non-oscillating type drum can be used on the grinder. However, a more uniform finish is generated by the oscillating drum and the life of the coated abrasive is longer than on the non-oscillating drum. The grinding drum is completely enclosed and an exhaust duct built into the hood removes the swarf generated by grinding.

The web stock to be ground is fed into the grinding area by a series of rubber-covered pinch rolls. Mounted directly under the grinding roll is a precision ground steel billy roll that supports the stock as it is being ground.

This billy roll is accurately adjusted vertically by two handwheels positioned on the operator's side of the machine. Either handwheel will actuate the worms and gears that move the billy roll up to the grinding drum. Moving either handwheel a full revolution will raise or lower the billy roll 0.005 in. A powered elevating mechanism with limit switches can be installed as optional equipment. A dial indicator, graduated in thousandths of an inch, is set on the feed table to provide a visual means of adjusting the cut.

For making adjustments that are finer than can be made with the dial indicator, graduated collars on the handwheels are marked in increments of 0.0001 in.

The billy roll is ground in the machine in order that it will be round and parallel to the grinding drum.

The sueding machine, a version of the Micro-Grinder, has found wide application in the textile industry.

This machine is equipped with wind and un-wind rolls to suede continuous webs of artificial and natural fiber textiles. A "nap" is raised on the cloth, and surface imperfections such as "motes," "neps," and "slups" are removed. Textile processors for the glove trade have been the largest purchasers of these machines.

Wire inserts form strong threads of magnesium

In converting the side covers of their calculating machine from aluminum to magnesium castings, the engineers of Marchant Calculators, Inc., Oakland, Calif., reduced the weight of their design. But to accomplish this change they found it desirable to improve the characteristics of the tapped holes.

This was done by installing Heli-Coil thread inserts into the prepared thread bosses of the cast side covers. Three inserts are used in each cover, forming 5/16-18 internal threads 5/16 in. long.

The inserts, helical coils of diamond shaped stainless steel wire, serve three purposes. First, they provide internal threads having a tensile strength up to 50 percent greater than is possible in the magnesium alone. Second, the tight fitting and specially treated stainless steel inserts prevent the electrolytic action that would result in corrosion if standard steel threaded fasteners came in direct contact with the magnesium. Third, in case the side plates are removed for cleaning or servicing the inner parts of the machine, there is no risk of damage, and wear to the threads, since the inserts are hard and tough.





A special report by the editors of MACHINE and TOOL BLUE BOOK

Report number 27

Grinding Machines . . . part 1 Tool and Cutter Grinders

This is the twenty-seventh in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on grinding machines are:

1. Grinding single point carbide tools.

2. Descriptions of late model grinding machines.

3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5. Milling machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw machines; 8. MAPI Replacement Formula; 9, 10. Chucking machines, Turret Lathes, Hand Screw machines; 11. Broaching machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers, 17. Gear making machines; 18, 19. Boring machines; 20. Drilling machines, parts 1, 2, 3, 4, 5, 6, 7.

Grinding single point carbide tools

By M. Bryan Baker, Associate Editor

THE "NEW" CUTTING tool materials, the carbides, introduced to American industry in 1928, have advanced tremendously as leaders in the field of high speed cutting mediums.

Very often new cutting alloys present grinding problems, and along with their development special abrasives and techniques are discovered or formulated. Since the cemented carbides cannot be machined in their ultimate form by any known metal tool, they must be shaped by grinding. As the carbides are entirely different from the high speed steel and cast alloy cutting materials, both in composition and physical properties, they require special

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Tool angle nomenclature.

grinding wheels and a different grinding technique.

Cemented carbide tools can be ground readily with either silicon carbide abrasive wheels or with diamond wheels. Aluminum oxide wheels, used for grinding steel, are not suitable for grinding this material and should not be used on carbide except for grinding the steel shanks.

Thermal stresses

Because of the extreme hardness and brittleness of the carbides, they are subject to injury from thermal stresses whenever the grinding conditions are too severe or when the grinding wheels have been permitted to become dull. For this reason many wheels are made soft so that the abrasive grains are removed as they become dull, by the process of normal wheel wear. This wear should be accomplished without the use of undue grinding pressure and be supplemented by dressing as often as necessary in order to keep the wheel sharp and free cutting. A harder grade tool may appear to give better wheel economy but will most always end in a large number of damaged tools as a result of localized overheating, when such wheels are pushed to make them cut. And, even though the rapid wheel wear may seem alarming, during the actual grinding, the wheel cost per unit of work turned out by carbide cutting tools is low, since such tools are capable of greatly increased production, provided they are properly resharpened each time.

Offhand or machine

With single point tools it is still common to sharpen them offhand, but with the day of the all-around machinist passing and the unskilled help necessary today, practice is leaning toward a shifting of this job into the toolroom to machines equipped to grind them to the exact angles and reliefs specified.

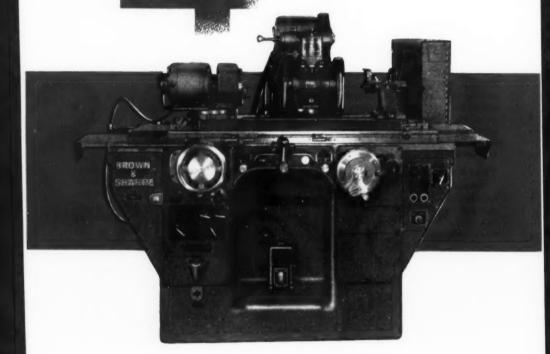
Two terms, relief and clearance angles. are often confused, in speaking of sharpening cutting tools, as meaning the same thing. According to the American Standards Association the relief angle is the angle between a plane perpendicular to the base of a tool or toolholder and the ground flank immediately adjacent to the cutting edge (Figures 1, 2, 3, 4). Its purpose is to give clearance to the heel of the tool and prevent it from striking or dragging on the work. The clearance angle is the angle between a plane perpendicular to the tool base and that portion of the flank immediately below the relief. It is sort of a secondary relief, and is sometimes so called. That part of the relief between the cutting edge and the beginning of the clearance is called the land. It gives strength and support to the cutting edge.

Rigid machine needed

There are some machine features for

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No. Grinding Capacity: swing, 10"; centers take nom. 20", max. 2234"

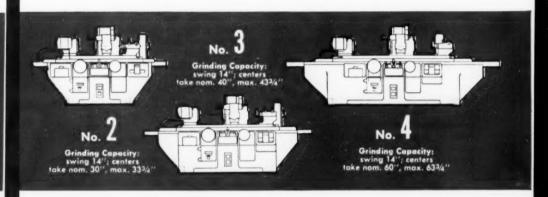
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ing of operating functions into automatic cycles extends the usefulness of this equipment beyond the toolroom and job shop, to many production applications.

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Apparent Angle Actual Angle Straight Wheel



The effect of wheel type on the relief angle.

offhand grinding of single pointed tools that are considered essential. They include: a rigid spindle free from vibration and end play; a reversible motor so that right and left hand tools can be ground on the same cup wheel; large tool rest tables that can be tilted easily and moved in and out to compensate for wear, and a scale for setting the table at any desired angle; provision for an ample flow of coolant from a large reservoir—no coolant at all is better than a scanty or unreliable flow, since liquid on a hot carbide tip will crack it.

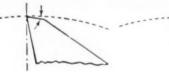
As has been mentioned, the prime requisite in grinding the carbide-tipped tools is to avoid thermal shock. The carbide itself may stand it but a carbide tip brazed to a steel shank will not. Without a coolant, trouble may be caused since the expansion characteristics are so dissimilar, setting up excessive strains. Some tips for grinding carbide tipped tools are: always grind the top surface of the tool first; next, rough grind the side relief angle, then the front relief angle; grind the

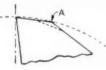
chip breaker, if any; finish grind the relief angles; and finally grind the nose radius; grind onto the cutting edge; keep the tool constantly in motion; unless the flow is steady and generous, grind dry and use soft grade wheels—a little coolant is a dangerous thing; never dip the tip of a hot tool into liquid to cool it; if tool is too hot to handle, it is too hot to quench.

Diamond or silicon carbide

With advocates of both silicon carbide and diamond wheels stating their cases, it's going out on a limb to say anything too much in favor of one over the other. The technique is still in a fluid state. Some say that diamond wheels, because of their great ability to sharpen many tools, or teeth on multi-tooth cutters, without losing enough to affect their accuracy, have been overrated. These devotees of silicon carbide feel that the diamonds actually cut grooves in the carbide while notches made with silicon carbide wheels are more rounded, therefore

 As repeated sharpenings increase the width of the land a secondary relief or "clearance" is needed.







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space and time-saving carbide
tool grinder nearer the production line ... to expand your
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Includes: 2 Diamond Wheels
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outperforming tools sharpened with the former. They would have silicon carbide wheels used on cemented carbide tools in all applications except finishing cuts on multi-tooth cutters and tools engaged in precision work.

However, it would seem that for offhand finish grinding, diamond wheels are holding their own as the type of abrasive wheel for finish grinding carbide single point tools, and the grinding of chip breakers, and multi-tooth

MATERIAL	Side Clear- ance	Frant Glear- anse	Back Rake	Side Roke	
Cast Irea	40.60	4.4		0°-2°	Ī
Brass	60	6"		40	
Brunze	6"	6"		40	
Copper	8"-18"	8-18	40	28"	
Aluminum	8 -10	8-18	25	15	
Steel (Annualed Stock)					
Screw Stock (SAE X-1112 X-1315)	60			3"	
Plain Carbon Steel (SAE 1020-1035)	6"			3	
High Carbon Steel (SAE 1895)	6	-	0	3	
Nickel Alloy Steel (SAE 2315-2335)	6	60	0	1	
Nickel Chromium Alley (3AE 3148-3256) 6°	60		3	
Chrome Molybdonum (SAE 4148)	6	60		1	
Nickel Molybdonum (SAE 4615)	100	80		1	
Chrome Vanadium (SAE 6145)	100	60		10	

*Keep Back Rake Angle as small as possible for greatest strength. Use Negative Rakes for older machines.

4. Clearances for carbide-tipped cutters.

cutters such as reamers, face mills, etc., as well. (These will be taken up in this series in a later issue of MACHINE and TOOL BLUE BOOK.) The advantages of diamond wheels, including exceptionally fast, cool cutting action and extremely low wear rate, as compared to silicon carbide, are well known.

Types of bonds

The same argument applies to resinoid bond in diamond wheels. Those who favor the resinoid say that many have gone overboard in their praise of the metal-bonded wheel, forgetting that it cuts more slowly than resinoid and in some cases causes "crazing." It is conceded that the metal bond is more rugged, and principles of its use are more easily taught to personnel. However, opinions differ greatly and should not be taken as the final word.

Experience only should be taken as the criterion.

Resinoid-bonded diamond wheels have an exceptionally fast and cool cutting action. Thus they are particularly suited to sharpening multi-tooth cutters, reamers, etc., for grinding chip breakers and for all precision grinding operations, including cylindrical, surface and internal grinding of carbide dies, gages, rolls, etc. When used for offhand grinding of single-point tools, care must be taken not to groove the diamond cutting face.

Metal-bonded durable

The metal - bonded diamond wheels are used for single-point tools, offhand grinding, particularly where durability, long life and resistance to grooving, rather than a very fast rate of cut, are the main considerations.

The vitrified-bonded diamond wheel combines a resistance to wear and grooving approaching that of metal-bonded diamond wheels and the fast cutting quality of resinoid-bonded diamond wheels. This type of wheel has rigidity that gives dimensional accuracy to the work being ground, a porous structure to promote faster and cooler cutting and positive adhesion between the vitrified bond and the abrasive cutting grains of diamonds which insures a long wheel life.

Such qualities serve to make the vitrified bonded diamond wheel especially suitable for reconditioning excessively dull or chipped single-point tools, using a 100 grit roughing wheel, and, for ordinary resharpening or finish grinding, using cup wheels around 220 grit. Since the diamond points protrude higher above the face of the bond than in the case of the resinoid or metal-bonded types of diamond wheels, the wheel has a noticeably sharper cutting action.

Typical sharpening jobs on single point tools in the carbide field fall into three classifications: ordinary dull tools that need only to be touched up on a fine grit diamond wheel, chipped or broken tools that need a great deal of reconditioning, and the standard tools that must be altered for special use or new tools whose tips have just been brazed on.

The difference between mere dullness and breakdown, especially in carbide tools, is a thin line. As such a tool loses its edge the pressure increases rapidly, the wear comes faster, accuracy suffers and if the work is at all fragile it may spring out of line.

If the tool has been used on steel, grind the top of the carbide tip to remove any crater, then the side and front relief angles, removing all marks of wear.

Chipped and broken tools

The first step is to grind the steel shank back and then cut the broken part of the carbide tip off. Use the corner of an aluminum oxide wheel and try to hold the original relief angles. Relieve the steel at the top of the tool behind the tip and then use a silicon carbide wheel to rough grind the tip. A cup or straight wheel is all right for the rough grinding. However, the cup wheel gives better control of angles and has a uniform cutting speed until worn out. A wheel of 60 grit is sufficient, dressed rough for cooler cutting. The broken end of the carbide tip should be hogged off. The table can be used as a tool rest and set at an angle of 20 or 30 degrees so that the tool can be more easily and firmly gripped. Rock and tip the tool during cutting to keep it in motion.

Rough grinding

One should start with the top face and follow with the side and then front reliefs. The table should be set for the rake angle desired with the wheel set to cut on the tip. Use the outer part of the crowned face of the wheel so the steel shank back of the tip won't be cut into. Use light pressure and

keep it moving until the top cleans up evenly.

The side of the tool should then be rough ground. Use an angle of clearance below the relief so that only the carbide tip will bear on the wheel during finish grinding. It's a good idea to keep this about three degrees greater than the primary relief. At the first sign of glazing, dress the wheel.

After the table is set at the clearance angle, rough the front of the tool. If it is handier to do this on the other side of the wheel, the motor will have to be reversed so as to use the edge. Keep the tool moving and if it gets hot from dry grinding, let it cool or begin another. Remember, never dip it in liquid to cool.

Backing off operation

In reconditioning single point tools or in grinding milled and brazed tools for the first time, the steel shank should be ground back to a slightly greater angle than the finished tip angle and then the tip may be ground to the desired angle. The backing off operation (Figures 5, 6, 7, 8) may be done either on the periphery of a straight wheel or on the side of a cup, dish, or ring wheel. The side grinding method is

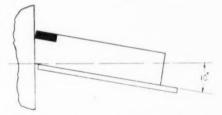
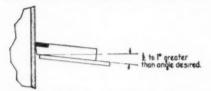


Diagram of the backing off on the side of a cup wheel.

slower than the peripheral. To give the most support under the carbide tip, a large diameter wheel should be used for this purpose. The smaller diameter wheels grind small radii which reduce the steel section supporting the tip. This might cause failure of the tool later.

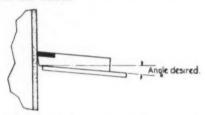
Grinding the tip should be done on the side of a diamond wheel to keep from under-cutting the cutting edge



6. Rough grind on a diamond wheel, 1/2° to 1° greater than the angle desired.

and to give a straight line from the bottom of the tip to the cutting edge.

The backing off operation need be done only once in up to ten grinds or so, since the ratio of steel to carbide increases after the tool is first backed off. After backing off the shank, grind the tip to the angle desired on the side of the wheel.



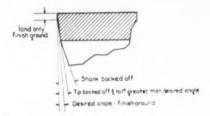
7. Finish grind on a diamond wheel to the desired angle, grinding only a small land back of the cutting edge. It isn't necessary to cut back the shank of small tools, ½" and smaller, since the area of the tool in contact with the wheel is small.

The setup of the machine can consist of a double end floor stand mounting a plain or cup wheel on one end for backing off and a diamond cup wheel on the other end for tip grinding. The wheels must be kept in balance or the vibration will likely cause an uneven wear on the wheel and a poor finish.

One of the ways to get a fine cutting edge offhand is like rough grinding in that the tip is rough ground to an angle ½° to 1° greater than the angle desired (Figure 6) and then ground to the correct angle on a finer grit diamond wheel. The result should be a small land back of the cutting edge. This land need be only about 1/16" wide.

Finish grinding

The diamond wheel is probably preferred by more machinists than any other for this job of finishing, yet many use fine grit silicon carbide. Diamonds



8. Enlarged diagram showing the various angles of the finished tool.

are especially good for tools that are to be used on cast iron or soft metals where a keenness is required.

Typical choices would be a 220 grit resinoid, metal or vitrified bond wheel or 100 grit silicon carbide. The top face should be worked on first, with the table set at the right rake angle, the operator proceeding as in the roughing steps, using plenty of coolant, moving the tool back and forth and dressing the wheel as the manufacturer recommends if it becomes glazed.

If a chip breaker is to be included, it should be ground in now, before the finish relief grinds. If nicks have developed while grinding the chip breaker, they can be taken out while attending to the reliefs.

Again, with the table set at the desired angle, finish grind the side and



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front reliefs. It is not necessary to finish grind the carbide tip's full thickness, but grind only enough off so that the relief angle extends about 1/16" below the cutting edge. By leaving a small land at the cutting edge and leaving clearance below the relief, only an occasional regrind will be needed for the clearance.

Finally, the nose radius should be ground by holding the tool lightly and turning across the face of the wheel in a wide arc, allowing the radius to blend into the side and front cutting edges. A template or radius gage should be used to check the large radii required on round-nosed roughing tools.

Common practice for fine edges is to sharpen high speed steel and cast alloy tools with aluminum oxide wheels running between 24 and 80 grit in a vitrified bond. Some machinists follow up with a 320 grit wheel, silicon carbide in shellac or resinoid bond. This improves the cutting edge to such an extent that it is sometimes brought to a smoothness of better than one and one-half microinches. Using a hard hone brings it to further refinement.

Hand honing

It is recognized that the cutting edge and nose radius of carbide tools will stand up longer between regrinds if they are hand honed at a 45 degree angle to leave a chamfer about .005" wide. But for non-ferrous metals and cast iron, it is best to leave the edge keen.

Certain fundamentals have survived changes of practice such as the advent of high speed steel, of Stellite and now of the carbides. Two of these might be: as soon as you suspect a tool needs resharpening, do it (a paradox of the machine shop is that the oftener you sharpen a tool, the longer it will last); keep a little oilstone in your pocket to keep the edge honed up better than the wheel will leave it, unless you are dealing with heavy hogging cuts.

Though it may be impossible to see, with the naked eye, the roughness in the edge of a tool ground on an ordinary wheel, it exists nonetheless. When this cutter goes up against the work, the individual peaks, small as they are, bear the heaviest loads and break off, leaving flat spots that rub instead of cut, generating heat. Then the remaining peaks in turn bear increased strain, plus more heat; and soon the whole edge is affected as well as the hardness of the cutter. More grinding means more time lost, more metal ground away, more expense.

Three steps

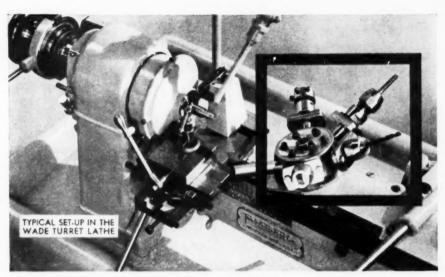
Three steps in refinement of edge are possible, through selection of coarse, medium and fine India (aluminum oxide), diamond or silicon carbide stones. Even though one deals in microscopic irregularities, such attention will so favorably affect the edge that it cuts much faster, leaves a far better surface, and makes many more of such desirable cuts before it slows because of dullness. Often, at the first sign of dulling, a simple restoning without removal from the machine will suffice for a long while.

After the stoning still further refinement is possible with hard Arkansas oilstones, natural products, smooth and white and superfine and hard. Such finishes can be applied to lathe bits, millers, and similar tools.

Wheels used for finishing cemented carbide tools are generally quite fine as compared to those used for sharpening other types of cutters. This is probably one of the reasons for the good results obtained from this material. When only slightly dulled in service, they can be touched up by hand and their cutting life between grinds prolonged.

Grinding troubles

Some grinding shops require a finish in micro inches while in others a good



ALCO TOOLS are being used in the better machines for producing the highest quality of precision work.



When specifications call for work to be kept to close tolerances on precision threading. Also Chucks and Holders deliver the goods. Absolute concentricity is assured with the naw famous concentric alignment feature of all Alco Tools. The drill, the tap, or the die are positioned while the flanges on the holder are open, and when the flanges are tightened simply with one wrench on the studs, these tools are concentric with the work and stay that way.

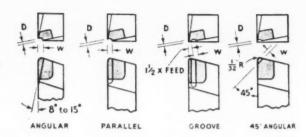
Even wear on the cutting face of taps and dies and drilling on exact centers means longer life for your threading tools and improved production with no rejects. This all helps to reduce scrap and waste and speed production. Also equipped screw machines are better able to compete on price because of these economies. Also Holders compensate for wear in the turret and the spindle and help to modernize ald machines.

ALCCFTOOLS

THE ALCO TOOL COMPANY 52 Birdseye St., Bridgeport, Conn.

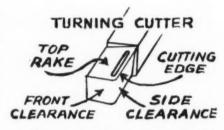
SEND FOR

Common types of ground-in chip breakers.



commercial finish is all that is required. However, if trouble is encountered because of rough finish these causes could be at the bottom: work speed too fast, traverse too fast, wheel too coarse or of wrong grade hardness, diamond too sharp, truing too coarse, cut too heavy, dirty coolant, lack of proper steadyresting or solution of coolant too weak.

If the wheel is not a true cylinder, it will not produce a work part of uniform size. It is essential that the wheel be carefully trued. An uneven wheel surface may be caused by a soft diamond dresser that does not hold up for width of wheel face, improper distribution of coolant over wheel face when truing, a diamond tool holder insecurely clamped or floating of the table while truing due to overlubrication of ways.



11. Here is one form of a plain turning cutter ground and ready for use. Notice the clearances and the rakes and their relation to the cutting edge. These same relationships apply to all shapes of cutters, whether the operation is turning, boring, facing, etc. Note the chip breaker indicated just behind the cutting edge.

If the diamond is too soft, then change to a harder one. The diamond may be too small for a wide wheel face. A chisel point diamond should be re-

Recommended Width of Chip Breaker (W)

Depth of Cut	Width (W) for Feeds (Inches per Rev.) of:				
Depth of Cut (Inches)	.006 to .012	.013 to .017	.018 to .027	.028 to .035	
1 to 3	1 16 3	5 64 1/	7 64 5	1/8	
16 to 12 16 to 34	3 2 1/8 5 3 2	$\frac{\frac{3}{3}}{\frac{3}{16}}$	$\frac{3}{16}$ $\frac{3}{16}$	16 3 16 3 16	

A Chip Breaker Depth (D) of .020" is satisfactory for most types of steel. It should never be less than $\frac{1}{4}$ " nor more than .030"

Thompson Type 2F SUPER PRECISION

Tool Room Grinder

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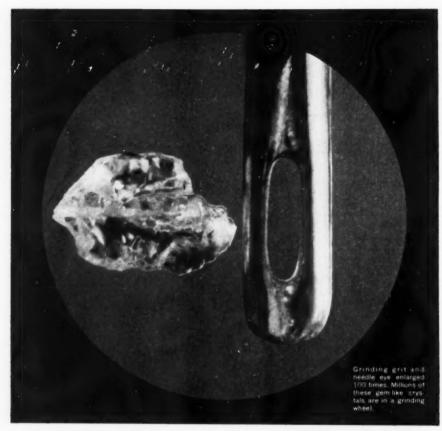
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- Handy control panel.
- · Elevation micrometer stop graduated in .0001".
- GROUND THREAD FEED SCREW
- Automatic wheel TRUING device.
- · Longitudinal hand wheel with automatic engagement,
- · Hydraulic head movement throttle with rapid traverse,
- · Hydraulic table movement throttle.
- · Elevating hand wheel graduated in .0005",
- GROUND THREAD FEED SCREW.

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Thompson SURFACE Grinders

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GRINDING GRIT IS START OF NEW CONCEPT THAT LED TO CINCINNATI GRINDING WHEELS

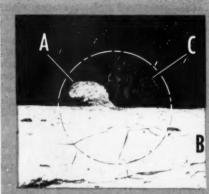
Sometimes looks deceive. A tiny grinding grit like the one above does not look like a cutting tool. It has no recognizable clearance or rake angles . . . no cutting edge is apparent . . . it cannot be accurately shaped . . . and it is very fragile.

Nevertheless, the grinding grit is a true cutting tool that functions in virtually the same manner as a tooth of a milling cutter.

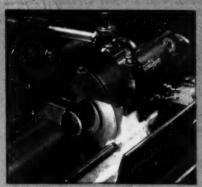
Research discoveries by Cincinnati Milling proved, beyond doubt, that the grinding process is a true metal cutting process. The grinding grits do not abrade or wear away the surface of a workpiece but form chips which agree in classification with the basic chip types found in other metal cutting processes. This entirely new approach is not based on hasty conclusions. It represents 25 years of Cincinnati Milling research, coupled with practical experience in applying the basic fundamentals of grinding to a wide variety of work on both centerless and centertype machines.

For you, this means grinding wheels developed and tested over a period of several years on the basis of true function—as true cutting tools forming true chips.

Available to you is a field organization of trained machinists who know grinding and grinding machines as well as grinding wheels. For a demonstration on your own machines of how to get the most out of Cincinnati Grinding Wheels, write, wire or phone Cincinnati Milling Products Division, The Cincinnati Milling Machine Co.



Frozen Action —Tiny steel chip (A) is shown being cut from workpiece (B) by a grinding grit (C).



RESEARCH GRINDING problems have ranged from the grinding of surgical sutures .004" in diameter to steel mili role 60" in diameter.



Front of the new, completely modern Cincinnati Milling plant where Cincinnati Grinding Wheels are manufactured.

FREE BOOKLET. Now available to industry is a new booklet entitled "A New Concept In Grinding wheels," It contains valuable information for everyone interested in grinding operations. A copy is yours for the asking. Just write Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.



placed with a wider or more rounded diamond.

If cooling is used, an even distribution over the entire width is essential. The diamond becomes white hot at the point of contact if the trueing is done dry. When coolant hits only the center of a wheel face, the surface of the wheel varies because of the expansion and contraction of the diamond as it cools and heats.

Chip breakers

Some years ago it was thought good practice to allow the chip to string out as long as it would without breaking. Nowadays a chip breaker, a small crater that ruins the chip, is generally ground into the tool face. The chip curls so tightly it breaks.

A mechanical breaker can be installed as a separate piece clamped to the tool face but it often proves unsatisfactory. One type of breaker is a round-bottomed groove just back of the cutting edge. but it tends to weaken the cutting edge. The most popular ones are the ground-in steps shown (Figures 9, 10, 11). The depth and width are subject to change with varying conditions; the angle of the back of the step is also variable. The depth of a chip breaker is usually about .015" to

.020" and the angle averages eight degrees.

To grind one, a resinoid bonded diamond wheel, 100 grit, standard or high concentration, with a face wide enough to do the job at one hitch, should be used. A 150 grit vitrified diamond wheel is preferred by some, though many use the 100 or 120 grit resinoid bond.

With a universal vise the operation is much easier. If the carbide tip has been set parallel with the shank the rake angle will have to be ground in the breaker, but if the tip is at the proper rake angle tilt, the breaker will be parallel to it. Be careful not to let the wheel pass over both steel and carbide, since steel tends to pull the diamonds from their resinoid bond. If unavoidable, use very light cuts.

The chip breaker doesn't need regrinding every time the tool is touched up.

References: The Norton Co., Wercester 6, Mass.

The Grinding Wheel Institute, Greendale, Mass.

Behr-Manning, Troy, N.Y.

The Carborundum Co., Niagara Falls, N.Y.
Warner and Swasey Co., Cleveland, Ohio.

Descriptions of late model tool and cutter grinders

Dynatomic grinder

The release of nascent atoms of nitrogen, chlorene, hydrogen and oxygen from the molecular decomposition of the Dynatomic grinding fluid reduces the generation of heat to a small fraction of normal. The mere chemical presence of the fluid on the wheel face suffices. To insure this the fluid is pumped through the spindle and wheel. An auxiliary jet on the wheel face,

however, scrubs away loose abrasive and carbide and keeps the wheel from loading. An extremely high wheel speed provides a high energy value to the abrasive particles, resulting in rapid material removal. This, in conjunction and collaboration with the chemical action of the fluid minimizes the energy absorption on work and wheel contacting surfaces. The wheels used in the process are in a semi-segmental form, a



specially developed combination of abrasive and bond material arranged in a structure and pattern specifically for Dynatomic grinding.

Willey's Model 60

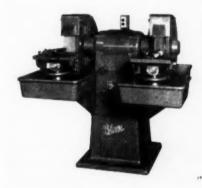
The Model 60 carbide tool grinder, made by Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich., has been properly designed for the freehand grinding of tungsten carbide-tipped metal tools as well as



other hard metals requiring the keenest cutting edges and extreme accuracy. The grinder handles rough, semifinish and finish grinding. The grinder is designed to use an eight-inch vitrified wheel for rough and semifinish, and a six-inch diamond or vitrified wheel for finishing. The cool cutting action of the wheels is insured by a steady flow of coolant, force fed by electrically driven pump mounted inside of the pedestal.

Blount's Model 220W double wheel

This 20" double wheel wet tool grinder, made by J. G. Blount Co.,



Everett, Mass., is of heavy-duty construction and is used for general purpose grinding or for high-speed steel or carbide tools, depending upon type of wheel supplied. The tables are adjustable to all possible tool angles. This model is equipped with large coolant reservoir in base. The motor-driven pump is attached to the rear of the column. The table can be raised, tilted, or lowered, depending on tool to be ground. The table top is made of hardened steel.

Baldor carbide tool grinder
This grinder, made by Baldor Electric Co., St. Louis 10, Mo., is designed



particularly for sharpening carbide tools quickly and accurately. It is large enough in all respects to sharpen tools up to 1" wide. In addition to sharpening carbide tool tips, the grinder may be used for dressing down the steel shank in which the carbide tip is held. The grinder also accommodates aluminum oxide wheels for sharpening high-speed steel tools. The table is accurately machined and can be tilted to a 45° angle from the face of the wheel. The angle is accurately measured with a protractor supplied as standard equipment with each grinder.

Standard twin wheel tool grinder

On this twin wheel grinder both wheels are at the front of the machine. The tilting table remains stationary.



Table lock and non-moving wearing features assure a solid, rigid table. A hinged structural plate steel guard is used for added safety. Each wheel is served by one built-in three-way coolant control valve on top of the guard. A waterproof reversing switch mounting is in center of panel at either operator's working position.

Each table has degree graduations, easily read, from 15° above to 30° below the horizontal. Adjustable splash guards are at the sides of each wheel. The grinder is made by The Standard Electrical Tool Company, Cincinnati 4, Ohio.

Brown-Brockmeyer carbide tool grinder

This ½ horsepower grinder is equipped with 6" x 1½" cup wheels and is available in both bench and



pedestal type. It is made by the Brown-Brockmeyer Co., Dayton 1, Ohio. The grinder comes complete with adjustable worktables, protractor, reversing switch and bearing lock device. It is equipped with oversize spindle and large, sealed ball bearings. Worktables are accurately ground. Table can be instantly reversed for grinding rightor left-hand tools.

Delta tool and cutter grinder

Milling cutters, reamers, taps, end mills, and other cutting tools can be sharpened on this grinder, made by Delta Power Tool Div., Rockwell Mfg.

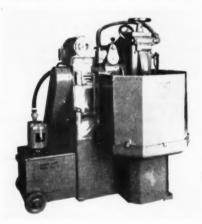


Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. Almost every conceivable angle can be accurately and easily ground. Table swivels a full 90° with a graduated scale and positive lock. The centers have a maximum spacing of 16¼". Distance from table to centers is 5.250".

By removing the tool and grinder attachment, the grinder may be used as a regular surface grinder.

Oliver template tool bit grinder

This grinder, made by the Oliver Instrument Co., Adrian, Mich., grinds single-point tool bits to any prede-



termined contour and combination of clearance angles. The toolholder consists of an iron frame supported at its lower end by a heavy ball and socket joint with a template at the upper end, which is a double-size replica of the tool being ground. Midway between the template and the ball joint is a mortise in which the tool is inserted.

A setting gage determines the correct amount of metal to be removed by grinding. The toolholder supports are located on a carriage, movable in relation to the face of the wheel to give the proper clearance. The wheel guard pivots to compensate for wheel wear. The clearance stays constant for any position of the carriage regardless of the wheel diameter.

Hybco tap grinder

On this tap grinder, made by Henry P. Boggis & Co., Cleveland 10, Ohio, taps can be ground to any chamfer angle and with any amount of relief. Proper hook in the flutes or spiral points can be produced to assure best results in various materials.



Chamfer sharpening heads are available in three sizes to meet different requirements. Each revolution of the hand wheel grinds and relieves lands.

Relief is controlled by adjusting screws through back of head.

Flute sharpening heads in three sizes corresponding to the chamfer heads are mounted on vertical slide and operated by hand lever. Double angle adjustment allows vertical setting for straight flutes and compound angle for spiral points.

Thomas Prosser Model EE

A quick-acting indexing device on these grinders, made by Thomas Prosser & Son, 120 Wall Street, New York, permits instant setting of the table to the desired angle, eliminating unnecessary loss of time and motion. The table stays locked at the angle to which it is set. Model EE has adequate equipment for wet grinding. The location



of the hubs on the shaft is easily adjustable, to compensate for wheel wear. The face of the wheel can be kept close to the edge of the table, and wheels can be used up practically 100%. Any desired combination of diamond, silicon carbide, or aluminum oxide wheels can be used, to suit individual needs, permitting roughing or finishing to any degree of finish on carbide, high speed, or stellite tools.

Lapointe universal broach sharpener

The swivel head slide and table roll on ball bearings, mounted between hardened and ground steel ways. The reduction of friction by use of ball bearings in these parts provides for an exceptionally easy moving table and slide which is most noticeable when a heavy broach is being sharpened. The grinding spindle is also mounted on ball bearings on swivel head which



can be turned in any position necessary to give proper angle to the teeth. The swivel head slide can be turned in a horizontal plane so that rectangular broaches with teeth on an angle can be sharpened correctly. The machine is provided with two handwheels, one to move the table and the other one to elevate the grinding head assembly to the proper position for sharpening the broach. The swivel head is provided with a handle by which the grinding wheel is moved back and forth across the cutting edge of teeth during the sharpening operations.

Colonial CS-36 broach sharpener

The broach on Model CS-36 is inserted between the motorized 2-speed headstock and the quick-release spring loaded center tailstock. Center point steady rests provide center point support opposite the wheel and on underside of broach on all broaches up to 6" diameter. The step-stop micro-feed is composed of a micro-feed hand-

cutlery cuts costs!

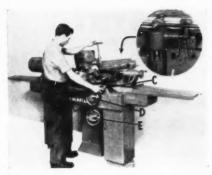


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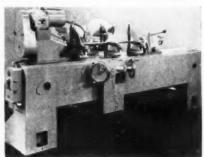
NORTH TONAWANDA, N



wheel (C) which controls the setting of a plunger (B) in the step-stop control. Bracket (A), when it contacts the plunger, limits the travel of the wheel when using the hand lever. Setting of bracket (A) for any broach is made with the wheel at full depth on the largest diameter tooth on the broach and with the plunger all the way out. The additional feed required from tooth to tooth as the broach diameter decreases is provided by the micro-feed handwheel. This feed is approximately equal to the step per tooth. Handwheel (D), Fig. 1, is for raising and lowering the head on the column. Made by Colonial Broach Co., Detroit 13, Mich.

American broach sharpening machine

The American model RBS-9-84, made by the American Broach & Machine Co., Div. of Sundstrand Mach. Tool Co., Ann Arbor, Mich., is designed to recondition round type broaches to their original accuracy. A new principle employed is that of rotating the broach between fixed centers on a rigid table and positioning the grinding wheel from tooth to tooth. The grinding wheel spindle is mounted on a carriage which is laterally traversed the length of the table. The carriage is on rails. The controls for positioning the grinding wheel to the broach and from tooth to tooth are conveniently placed at the front of the carriage.



Specifications of American Built Grinding Machines

The Brown-Brockmeyer Co.

Company makes a ¼ h.p. Carbide Tool Grinder equipped with 6"x1½" cup wheel. Available in bench and pedestal type.

Baldor Ele	St. Louis 10, Mo			
Type and Model	Wheels	S=Shaft Length, Over-all T=Size of Table	Capacity	H.P. and R.P.M.
Carbide Tool Grinder	Cupwheels 6" dia. x 1" face Recessed 4" dia., 1" deep Wheel hole=1%"	S=13" T=12"x6%"	Tools up to 1" wide	½ h.p.—3400 r.p.m.

iver Instrument	Co.			Adrian, Mich.		
Type and Model	Capacity	Wheel Size	Speed and H.P.			
Tool Bit Grinder	Tool bits up to	20"x2"x5" hole 5"x2"x%" cup	175 r.p.m. and 3 h.p.			
Automatic Face Mill Grinder	A fully automatic, hydraulically operated machine for sharpening face milling cutters; capacity 10" to 21" face mills.					
Pointer No. 510	For drills 34" to 3", 2, 3, and 4-flute. Variable clearances, variable point angles. Automatic operation.					
Bench Drill Grinder	Bench grinder, hand-operated, for drills No. 57 to ½". Right-hand, with an improved point.					
Arc Face Mill Grinder	A precision machine, hand-operated, designed for the accurate sharpening of face mills, 6" to 26" in diameter. Cutters may be sharpened either with or without radius. The radius may be varied from 0" to 2". Also available for fully automatic operation.					
Universal Tool and Cutter Grinder Standard	Dist. between centers = 15" Swing=8" Dist. between grinding wheel and table = 7%"	Size of table=3½"x24" Angular adjustment of table=45° Angular adjustment of spindle head=180° of carriage=180°	Wheels 2%"x1%"x%" No. 11 cup; 4"x%"x%" saucer; 3"x1%"x%" straight cup	Max, horizontal travel of grinding unit = 16"; Vert. adjustment of grinding wheel=1"		
Heavy-Duty	do Dist. between grinding wheel and table=7%"	do	3"x2½"x1¼" No. 11 cup; 5"x½"x1¼" saucer; 4"x2"x1¼" straight cup	Max. horizontal travel of grinding unit=7"; Vert. adjustment of grinding wheel=14"		

Villey's Carbide	Villey's Carbide Tool Co.			Detroit, Mich.
Type and Model	Wheel Size	Table Size	Speed and H.P.	Floor Space
Corbide Tool Grinder Model 50-A	6"x1¼"x2½" silicon carbide; 6"x3¾"x1¼" diamond wheel.	6"x12"	3450 r.p.m. and % h.p.	19"x30"
Model 60	8"x1%"x4" silicon carbide: 6"x%"x1%" diamond wheel.	8"x18"	3450 r.p.m. and % h.p.	30" x44"

The Dynatomic	Corporation.			Chicago 3, III
Type and Model	Wheel Size	T=Table Working Area TT=Tilting Table Working Area	L=Long. Travel K=Knee Vert. Travel C=Cross-feed Travel	Speed and H.P. (Drive Motor)
Carbide Tool Grinder	10" dia.	T=9%"x42" TT=10"x19"	L=13¼"; K=14%" C=5"	3500 r.p.m. and 10 h.p.

Colonial Bro	ach Co.	Box 37,	Harper Station, I	Detroit 13, Mich
Type and Model	Capacity R=Round Broaches, Max. Length and Diameter F=Flet Broaches, Max. Length and Width	Travel W=Work Table H=Horizontal Slide V=Vertical Slide	Speeds and Horsepower	Dimensions T=Table Length and Width F=Floor Space, Allowing for Table Travel
Broach Sharpeners FS-36 Flat Broaches	F=32" and 8"	W=36" H=10" V=12"	4000 r.p.m. standard % h.p.	T=48"x11½" F=53"x124"
FS-48	F=44" and 8"	W=48" H=10" V=12"	do	T=60"x11½" F=53"x170"
RG-36 Round Broaches	R=36" and 6"	W=36" H=10"	4000 r.p.m. standard 200 and 400 r.p.m. headstock spindle 1 and 1/3 h.p.	T=60"x11½" F=53"x144"
RG-84	R=84" and 6"	W=82" H=10"	do	T=111"x11½" F=53"x205"
CS-36	R=36" and 6" F=32" and 8"	W=36" H=10" V=12"	3/4 and 1/3 h.p.	T=60"x11½" F=53"x144"
CS-84	R=84" and 6" F=78" and 8"	W = 82" H = 10" V = 12"	3/4 and 1/3 h.p.	T=111"x11½" F=53"x205"

	Wheels D=Diameter F=Face			
Type and Model	H = Height Ho=Hole	Table Size	Speeds and H.P.	Floor Space
Carbide Tool Grinder Model 10TD Twin Wheel (cup)	D=10"; F=1½"; H=2"; Ho=2"	19"x10"	1970 r.p.m. and 1½ h.p.	44"x30"
Model 14TD	D=14"; F=1½"; H=4"; Ho=1¼"	24"x12"	1400 r.p.m. and 3 h.p.	54"x37"
Model 10T Single wheel (cup)	D=10"; F=1½" H=2"; Ho=2"	19"x10"	1970 r.p.m. and 1 h.p.	22"x30"
Model 14T	D=10"; F=1½"; H=4"; Ho=1¼"	24"x12"	1400 r.p.m. and 2 h.p.	27" x37"
Model 145 Straight wheel	D=14"; F=2"; Ho=14"	10"x10"	1635-2180 r.p.m. and 2 h.p.	35"x29"
Model 16S	D=16"; F=2½"; Ho=6"	do	1550-1980 r.p.m. and 3 h.p.	35"x30"
Model 20S	D=20"; F=2½" Ho=9"	do	1240-1525 r.p.m. and 3 h.p.	35"x35"

			w York 5, N .Y	
Type and Model	Size of Wheel	Size of Base	Remarks	Spindle Speed and H.P.
Carbide Tool Grinder Model AA Floor Type	7" silicon carbide; 6" diamond	12"x13"	Also available in bench type	3450 r.p.m. and ½ h.p.
Model EE	7" silicon carbide	18"x23"	New grinder Model AW is now in preparation	3400 r.p.m. and I h.p.

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Type and Model	Capacity	Max. and Min. Hole Size H= Hole Through Spindle	Remarks	
Top Grinder Size A No. 4 mach. scre to %" hand tap %" pipe taps; Size A collet		Max500"; .070" min.; H=17/32"	A-234-RC sharpens 2, 3, or 4-flute tap: right-hand threads. A-234-RC sharpens 2, 3, or 4-flute tap: left-hand threads. A-234-RLF sharpens 2, 3, or 4-flute tap: left and right-hand threads.	
Size B	No. 6 mach, screw to 2" hand taps; 'h" to 'h" pipe taps; Size B collet	Max800"; .125" min.; H = 13/16"	B-234-RLC; 2, 3, or 4-flute taps, let and right. B-568-RLC; 5, 6, or 8-flute taps, let and right. B-234-RLF; 2, 3, 4, or 6-flute taps, let and right.	
Size C	%" to 1%" hand taps; %" to 1" pipe taps; Size C collet	Max. 1.250"; .500" min.; Blind spindle; Max. shank length=3\%"	C-456-RLC; 4, 5, or 6-flute taps, let and right. C-468-RLC; 4, 6, or 8-flute taps, let and right. C-46-RLF; 4 or 6-flute taps, left or right	

Type and Model	Max. Length and Width to Be Ground	DC=Dia. of Cup Wheel DW = Dia. of Wheel	Table Surface	Spindle Speed
Chipbreaker Grinder Model 1100 No. 24-205	13½" and 6"; Bottom of 7" wheel to table=11½"	DC=3%"; DW=7"; Wheel hole=1%"	5%"x13"	3200 or 4200 r.p.m.
Tool and Cutter Grinder No. 24-305	16¼" dist. between centers 5.250" table to center	DC=4"; DW (dish wheel=6"; Wheel hole=114"	5%"x13"	3200 or 4200 r.p.m. or 2700 or 3500 r.p.m.
Carbide Tool Grinder Floor type (Also available in bench type)		DW=1"x6" silicon carbide, 1" face; 1%" hole	7"x13"	3450 r.p.m. ½ h.p.

Type and Model	Capacity Between Centers	V=Vert. Adjustment of Column S=Min. Dist. Spindle to Top of Table	C=Cross Travel of Wheel L=Long. Travel of Table	S=Speed of Grinding Spindle and H.P. F=Floor Space Required
Broach Sharpening	36"x8" work surface of table	V=10" S=4%"	C=10"; L=38"	S=3450 and 1 h.p. F=70"x85"
60"	60"	V=10" S=4%"	C=10"; L=56"	S=3450 and 1 and ½ h.p. Speed of headstock spindle=300 and 500 F=50"x204"
72"	72"	do	C=10"; L=66"	f=50"x224"
80"	80"	do	C=10"; L=72"	F=50"x224"

Type and Model	Wheel Size	P=Size of Pan BP=Bottom of Pan to Center of Wheel	Dist. from Wheel to Outside Front Edge of Pan	Speeds and H.P.
Wet Tool Grinder Model E, 14"	14" x2" x6"	P = 22½"x18"x4½" BP = 8"	12"	1700 r.p.m. and 1 h.p.
Model F, 20"	20"x21/2"x9"	P=37"x22½"x6" BP=10"	15"	1000 r.p.m. 2 h.p.
Model H, 30"	30"x3"x16"	P=52"x26"x8" BP=11%"	19"	720 r.p.m. 5 h.p.
Wet Tool Grinder Carbide		ons as Model F, 20". lowers 2" from center		of table up to 35

(Div. Sund	Ann Arbor, Mich			
Type and Model	Capacity Max. Diameter and Max. Length Between Centers	Carriage Travel	Cross Feed (Plus 4") Adjustment of Grinding Head	Over-all Length and Width
Broach Sharpening RBS-9-60	9" and 60"	55"	51/2"	110"x50½"
RBS-9-84	9" and 84"	79"	do	134" x501/2"



Electrolytically-assisted diamond wheel grinding of cemented carbide

Editor's note: As a possible means of conserving diamond bort, the Norton Co., Worcester, Mass., has been carrying on experiments under the direction of Dr. N. W. Thibault and B. H. Anderson, evaluating electrolytically-assisted diamond wheel grinding of cemented carbide (see page 219, December MACHINE and TOOL BLUE BOOK, "New Grinding and Machining Processes Promise Conservation of Diamonds"). Their conclusions in brief form follow.

. . We feel that diamond wheel grinding, assisted by electrolysis, is promising as a commercial method for sharpening single-point carbide tools. We believe that commercially acceptable rates of cuts as compared to our vitrified bonded diamond wheels in conventional grinding can be maintained with our grade N metal bonded wheels, operated with electrolytic assistance on the order of 250 amps./sq. in., and with a diamond consumption which is only a fraction of that required for the same operation using our vitrified bonded diamond wheel in conventional grinding. Thus, electrolytically-assisted diamond wheel grinding does offer a means of conserving diamond bort.

"However, there is evidence of some attack on adjacent edges by electrochemical erosion during electrolyticallyassisted diamond wheel grinding under those operating conditions most conducive to high efficiency. In spite of this, preliminary tests of carbide tools ground with a metal bonded diamond wheel electrolytically-assisted have indicated comparable performance and life to similar tools ground conventionally with a vitrified bonded diamond wheel. However, we feel that (1) until additional comparative tests of this nature have been made, (2) until our conclusions as to rate of cut and diamond consumption reached as a result of our laboratory study have been confirmed by field experience, and (3) until other aspects of electrolytically-assisted diamond wheel grinding have been investigated more thoroughly, we cannot yet unqualifiedly recommend the method for the commercial sharpening of single-point carbide tools.

"Electrolytically-assisted diamond wheel grinding will show little or no over-all cost advantages over conventional diamond wheel grinding of single-point carbide tools unless a rate of cut at least closely approaching that being obtained in conventional grinding, such as with a vitrified bonded diamond wheel, can be maintained with electrolytically-assisted diamond wheel grinding using a metal bonded wheel. This is because, even in conventional grinding, labor and overhead charges are much higher than wheel cost per unit of carbide removed in this operation.'

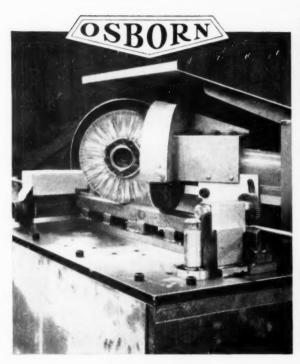
Hone gives carbide tools longer "between grinds" life The Chicago Wheel & Mfg. Co., Dept.

The Chicago Wheel & Mfg. Co., Dept. BB, 1101 W. Monroe St., Chicago, Ill., announces a new hand hone specially developed for on-machine sharpening



of single-point tungsten carbide tools. The manufacturer claims up to 30% longer "between grinds" tool life results when the new hone is used at the first signs of tool dullness. The user merely applies a few light strokes over tool edge, taking care to hold hone flat against surface so as not to round cutting edge or change relief angle.

Made from silicon carbide, the hone is bonded with the company's XL vitrified bonding process.



Formerly 50 minutes... Now brush-deburred in 6 minutes

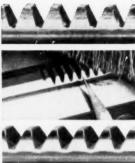
8 tunes as fast...more uniform deburring...finer surface finish. These are the advantages gained by a large machinery manufacturer with an automatic power-brushing method. The part: a rack gear, 17 ft. long with more than 1000 teeth. The job: light deburring of machine-cut teeth, and blending the junctures of intersecting surfaces to form smooth curves in place of fragile, sharp edges.

With the help of their Osborn Brushing Analyst, they devised the machine shown above. This automatically controlled machine with two heads of Osborn Fascut, brushes does the entire job in 6 minutes. Burr removal and surface juncture blend are far superior to former methods.

This is typical of thousands of cases where production is being vastly improved with Osborn power brushing methods. Find out how you can cut your costs! Call in your OBA today or write The Osborn Manufacturing Company, Dept. L-2, 5401 Hamilton Avenue, Cleveland 14, Obio.



OSEGEN FOWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



BEFORE AND AFTER. Top view shows closeup of rack teeth with light burrs and rough surface before brushing by new "push-button" method. Center view shows closeup of rack in machine after completion of brushing. Bottom view shows teeth after brushing. Note uniform surfaces and smooth finish on all teeth.



HOW IT'S DONE. Two rotating Osborn power brushes, engage rack teeth at angles as shown. At push of button rack drives through machine at about 5 ft. per minute. When the rack completes passage, the drive reverses and sends it back in the other direction. On return travel of part, the direction of brush rotation is reversed to contact surfaces on the opposite side of rack. This gives both sides of teeth uniform brushins.



WHAT'S YOUR PROBLEM? The nearby Osborn Brushing Analyst is experienced in working with machine designers and methods engineers to solve problems with the latest power brushing techniques. Feel free to call him for help!









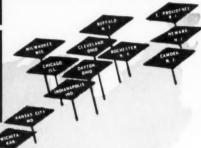
Standard Clamps and Components

AVAILABLE IN STOCK

all over the U.S.









STOCKS AT FACTORY AND FOLLOWING: T. R. Goldsmith & Son, 33 Clyde Ave.—BUFFALO 15, N. Y. Fidelity Tool Supply, 309 Vine St.—CAMDEN 2, N. J. J. R. Reinertson & Co., 24 S. Crawford Ave.—CHICAGO 24, ILL. T. E. Wardrope Agency, 10014 Euclid Ave.—CLEVELAND 6, OHIO H. D. Geisler Co., 2715 Salem Ave.—DAYTON 6, OHIO Mfgrs. Service Supply, 242 Taunton Ave.—E. PROVIDENCE, R. I. Art Lewis Product Equipment Co., 422 Magnolia Ave.—GLENDALE 4, CALIF. Standard Die Supply, 26 E. McCarty St.—INDIANAPOLIS 25, IND. Ernst Machine, 1606 Oak St.—KANSAS CITY 8, MO. Bell-Well Sales Co., 1323 N. Water St.—MILWAUKEE 2, WIS. Columbia Eng. Co., 113-119 Sussex Ave., NEWARK, N. J. Roessel & Co., 683 Hudson Ave., ROCHESTER 21, N. Y. H. F. Soderling Co., 1745 4th Ave. South—SEATTLE 4, WASH. Cummings & Co., 115 E. Lewis St.—WICHITA 2, KAN.

WEST POINT MFG. CO.
26935 W. 7 Mile Road, Detroit 19, Mich.

AVAILABLE LITERATURE

Catalogs, bulletins available from manufacturers

- 1. A comprehensive folder showing detailed drawings of the various models of Robert J. Kelly clamps, featuring balanced design, positive gripping control and one-hand release, for welding, woodworking, gluing, all mechanical production, etc., has been published by the Robert J. Kelly Mfg. Co., Box 61, Dept. BB, Broadway Sta., Newport, R. I.
- 2. "Spectrographic Analysis of Diesel Engine Lubricating Oil," published by American Locomotive Co., Dept. BB, Schenectady, N. Y., tells in 78 pages of text and photographs how the spectrograph—a scientific instrument that can detect exceedingly small amounts of chemical elements in any substance—is now being used by diesel locomotive engineers to control engine maintenance and prevent costly breakdowns.
- 3. The Standard Pressed Steel Co., Dept. BB, Jenkintown, Pa., has prepared a new four-page bulletin describing in pictures and text the company's entire line of steel work benches, cabinet benches and SPS' recently developed multiple unit benches with cabinet and drawer-section pedestals for storage.
- 4. New wall chart, No. 5237, has been released by Macwhyte Co., Sling Dept. BB, Kenosha, Wis. The chart combines crane signals and suggestions for proper

- use of slings on one side. On the other side are tables listing strengths and safe-loads.
- 5. With the increasing use of metal spinning as a method of cutting costs on short runs of drawn parts, a new booklet is available on "Metal Spinning Tools and Their Use," just issued by Boice-Crane Co., Dept. BB, 936 Central Ave., Toledo 6, Ohio.
- 6. Metal Carbides Corp., 107 E. Indianola, Youngstown 7, Ohio, announces publication of a new 72-page general catalog, No. 52-G, covering their full line of tungsten carbide products—cutting tools, draw dies, bushings, gages, centerless blades, rolling-mill work rolls, diamond wheels and wheel dressers, and solid carbide stock. Extensive data is included on speeds and feeds, brazing and grinding instructions, grinding wheel recommendations, coolants, etc.
- 7. The new Lindberg gas-fired vertical radiant tube furnace is described in Bulletin 241 by Lindberg Engineering Co., 2442 W. Hubbard St., Chicago 12, Ill. The new 4-page bulletin contains a listing of design and application features, photos and diagrams of this radically new furnace which may be used for carbonitriding, as well as carburizing, annealing, carbon restoration and other hardening jobs.

Are You Wasting Dollars
Trying to Save Pennies
On Cut-Off Jobs?



A Wells Metal Cutting Band Saw pays for itself in savings

IT'S easy to fool yourself about costs on your cut-off jobs. Perhaps you say, "It doesn't amount to much, why worry about how we do it." You'd be surprised. Look at what a Wells Saw gives you—Modest first cost with a model for every budget . . . Rugged, heavy duty construction for minimum cost per year . . . Fast, continuous band saw cut-

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with wet cut-

ting . . . Accurate cutting to minimize subsequent machining . . . Simple operation that requires no special skill.

To cut your cut-off costs, ask your Wells Distributor for further information or write direct.

Standard Wells Saws: No. 49A— $3\frac{1}{2}$ " x 6 $\frac{5}{2}$ "; No. 5—5" x 10"; No. 8—8" x 16"; No. 12—12" x 16". Wet cutting systems available for Nos. 5, 8 and 12. Automatic bar feed available for Nos. 8 and 12. Special machines for capacities to 48" x 48".



Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION 707 COOLIDGE AVE. • THREE RIVERS, MICH.

8. "Meco" welding equipment—every type necessary for oxy-acetylene welding and cutting operations—are included in Catalog 150, recently announced by the Modern Engineering Co., Dept. BB-46, 3415 West Pine Blvd., St. Louis 3, Mo. The text, with over 150 illustrations, provides a complete and comprehensive guide for welders.

9. Smith & Mills Co., 400 W. Madison St., Chicago 6, Ill., has just issued a

new 12-page catalog of both the standard and heavy-duty lines of Smith & Mills shapers. Complete descriptions, illustrations and specifications of design features are included.

10. Continued developments in the field of sintered carbides prompted the Carmet Division of Allegheny Ludlum Steel Corp., Dept. BB, 2020 Oliver Bldg., Pittsburgh 22, Pa., to publish the 13th edition of its carbide alloy catalog. The new 32-page brochure contains



This new and complete line of diamond wheels and hones is in the same tradition of excellence as our famous laboratory graded STAR-DUST diamond lapping compounds and powders.

After years of product research we have developed our own special bonds which are proving definitely superior in use. For free cutting, durability and a minimum of loading, it will pay you to investigate this new addition to the STAR-DUST line. There are all types and sizes, and deliveries are excellent . . . We invite your trial orders!

Write us today for comprehensive new catalog A7.

You've "Laps Ahead" with Star Dust,

DIAMOND WHEELS AND HONES • DIAMOND LAPPING COMPOUNDS AND DIAMOND POWDERS

ACE ABRASIVE 250 WEST 57th STREET

the most recent information on new Carmet production techniques, as well as new applications of this hardest of known metals.

11. The Mead air power catalog—1953 edition—has just come off the presses and is ready for free distribution, according to Mead Specialties Co., Dept. P-6, 4114 N. Knox Ave., Chicago 41, Ill. This new larger (56 pages) edition pictures and describes the entire Mead

line of single- and double-acting air cylinders, and air-operated presses, vises, chucks, valves, hammers and work feeders.

12. Doerr Electric Corp., Dept. BB, 100 N. Fourth Ave., Cedarburg, Wis., is releasing Bulletin 100, a 4-page folder covering special application designs for pump, brake, power tool, hoist and fan motors, motor parts for built-in drives, and typical industrial uses.



"XL" is Chicago Wheel's exclusive new bond for silicon carbide vitrified grinding wheels, especially made for grinding carbide cutting tools. Ideal for rough and finish grinding . . . offhand or precision automatic. Supplied in most popular sizes and steel backs. Prompt delivery. Keep your production up . . . costs down, with "XL."

Write today for information-Dept.MT

CHICAGO WHEEL & Mfg. Co.

1101 West Monroe St., Chicago 7, Illinois
OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

13. A new TS diesel engine bulletin, Form 16027, may be obtained from Ingersoll-Rand Co., Dept. BB, 11 Broadway, New York 4, N. Y. Sectional wash drawings, installation views and diagrams are incorporated in this 12-page, 3-color catalog.

14. A Modern 4-way drilling, boring and facing machine for aircraft jet engine housings is pictured and described, with complete operating specifications, in Bulletin 103-34, available

from Modern Industrial Engineering Co., Dept. BB, 14230 Birwood Ave., Detroit 4, Mich.

15. Stryker Machine Products Co., Dept. BB, 221 John Fitch Way, Trenton, N. J., has issued a 4-page folder presenting data on their equipment and facilities for the production of precision machined parts. This bulletin, obtainable on request, illustrates machines available, as well as giving a complete list of equipment, such as automatic screw





Side Milling Cutter — H.S.S. — Featuring our Step Tooth



Side Milling Cutter, Staggered Tooth H.S.S. with Step Tooth.



Single Angle Cutter H.S.S.

Double End Mill 4 flute — Right Hand Cut Right Hand Spiral H.S.S.



Convex Cutter H.S.S. This Cutter is made in both Standards.



Concave Cutter H.S.S. This Cutter is made in both Standards.

Double End Mill 2 flute Right Hand Cut Right Hand Spiral H.S.S.



STANDARD AND SPECIAL CUTTING TOOLS

F & D tools are made under the most rigid quality control standards with 100% final inspection to assure positive uniformity and afford large savings in production costs.

The F & D Step Tooth Cutter gives a greater dissipation of heat, makes easier sharpening and makes closer control possible.

The F & D Cutter line is stocked by leading distributors

in your area.

Write the factory for our new No. 12 Catalog and current resale price list. Include request for current stock



(Several attractive distributor areas are still open.)

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list.

MACHINE AND TOOL WORKS

THREE RIVERS, MASSACHUSETTS



machines, turret lathes, inspection equipment, etc.

16. Over 100 different marking tools and devices are described and illustrated in the new 28-page Mecco safety-marking tool catalog published by M. E. Cunningham Co., 1043 Chateau St., Pittsburgh, Pa. The basic groupings of products are: made-to-order hand stamps, inspection and symbol, letter and figure. mold and press stamps; marking machines and fixtures; special

marking outfits; press and hand-type holders; dies and die inserts; engineers' and inspection hammers; and steel type.

17. Utica Drop Forge & Tool Corp., Dept. BB, Whitesboro St., Utica 4, N. Y., is now offering a new and improved tool catalog No. 66-1952. This well-illustrated catalog contains a useful list of decimal equivalents and pertinent data on all Utica tools in many sizes—82 models of regular and custom-built pliers, adjustable wrenches, etc. A





Write for complete catalog of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION FOSTORIA, OHIO

Localites available through wholesalers everywhere

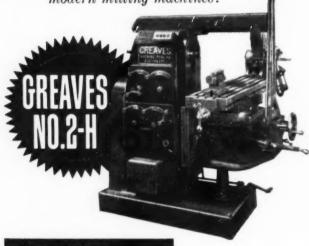
special feature of the catalog is the accurate diagramming of the tool jaws with dimensions.

18. S. G. Frantz Co., Inc., Dept. BB, Centre St., Trenton 6, N. J., in their Bulletin 76 provide complete information on the Frantz "Ferrofilter" permanent magnet separator. This equipment is designed for removal of abrasive ferrous particles and chips from circulating lubricating systems on machine tools, internal combustion engines, plant and process equipment; from hy-

draulic oil lines on hydraulic presses and hydraulic systems of machine tools; from coolant systems on machining operations, etc.

19. The Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn., manufacturers of Maxitorq floating disc clutches, has put out a new 1953 catalog containing information, photos and diagrams of standard Maxitorq clutches in 8 sizes, with capacities from ¼ to 15 h.p. at 100 r.p.m.

your best buy in modern milling machines:



Plain or Universal

• Offers every modern milling machine advantage:

18 spindle speeds 25 to 1250 rpm, 18 feeds $^{1}2^{\prime\prime}$ to 30" per minute, rapid traverse. Timken bearings and many others.

You can't buy a better combination of simplicity, rugged construction, ease of operation, accuracy and production speed.

Send for bulletin and price list.



THE GREAVES MACHINE TOOL CO.
2600 Eastern Avenue. Cincinnati 2. Ohio

20. A 24-page pipe thread manual, No. C-52—listing complete design and gaging information, and specifications for the three major standard pipe thread systems, also specifications for taper and straight pipe taps, thread plug and ring gages—is available from Detroit Tap and Tool Co., Dept. BB, 8615 East 8-Mile Rd., Baseline, Mich.

21. Molykote lubricants are detailed in Bulletin 95, recently released by The

Alpha Corp., 179A Hamilton Ave., Greenwich, Conn. The booklet describes Type Z, the dry powder lubricant; Type G, the grease consistency mixture; Type M-88, a dispersion of near-colloidal particles of Molykote powder combined with an organic binder in a volatile solvent; and other products of The Alpha Corp.

22. "The Hall of Giants" gives a pictorial step-by-step story of the manufacturing operations involved in the

48-HOUR DELIVERY .



ON STANDARD MALE IREAD GAGES

And most standard thread plug

gages are on our shelves for even faster shipment. This includes all sizes, from 0-80 NF to 11/2"-6 NC, class 2 and 3, in stock.

How can Perfex maintain quantity stocks of all these popular sizes? It's simple: we've expanded our plant and facilities, added more and more fine thread grinding and checking equipment and increased our force of skilled gage-makers in order to assure you of complete service. Now we're ready to prove the quality of our work and prove it to you today, not in six weeks!

Remember Perfex for your gage needs—thread plugs, thread rings, specials from the smallest up to giants. Perfex is represented in all principal industrial areas; please write for copy of new catalog and name of the Perfex man nearest you. He's as close to you as your telephone.



PERFEX GAGE & TOOL CO.

122 Avery St.

Mt. Clemens, Mich.

production of the so-called mechanical giants, the Clearing presses. This unusually attractive brochure is available from Clearing Machine Corp., Dept. BB, 6497 W. 65th St., Chicago

23. General Roto-Heads, made by General Roto Co., Dept. BB, 8914 Melrose Ave., Los Angeles 46, Calif., are claimed to make one lathe do the work of ten. according to Bulletin 4577 issued by the company. Simplicity of operation, easy setups, removable tool slides, 23 shoulder lengths and cutoff and 16 diameters from each setup are among features illustrated and explained in the folder

24. The Simmons Machine Tool Corp., 1725 N. Broadway, Dept. BB, Albany 1, N. Y., tells-in Bulletin No. 92952how its heavy-duty geared-head engine lathes have been redesigned for more power and rigidity. These lathes are adaptable for ordnance plants,

SAVE 3 WAYS



CHECK THESE PRICES

Size	2000'	2300'
6x 6x12"	\$ 467.00	\$ 548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
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Complete	with 100%	automatic
elec	ctronic cont	rols.

2 SAVE ON MAN Lucifer Electris Furnace. Less operator attention needed because Lucifer controls are EXACT. They reach SPECI-FIED temperature without variation. No special experience required when you use a Lucifer.

SAVE on maintemance expense with
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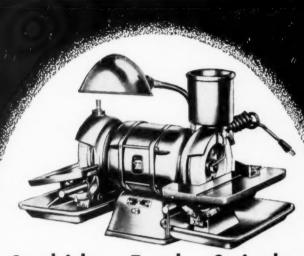
Phone Hatboro 0411

shipyards and other shops where heavy work in turning, facing and threading to close tolerances is routine. The folder includes a detailed specification sheet.

25. Economy in polishing is explained by "Polisher Pete" in an easy-to-read handbook put out by Behr-Manning Corp., Division of Norton Co., Dept. BB, Troy, N. Y. Reasons for low production and high rejects are plainly pictured in comic-strip fashion by the artist, with a down-to-earth solution

for Pete's problems.

26. "This is our punch line" is the manufacturer's introduction to Catalog No. 352 which details the precision quality piercing punches made by Accurate Bushing Co., Dept. BB, 443 North Ave., Garwood, N. J. Catalog No. 652 describes their line of drill jig bushings, liners and accessory parts. Both pieces of literature contain details of all tolerances and other dimensional and technical data.



Carbide Tool Grinder for precision work

The ½ hp motor that powers this Baldor Carbide Tool Grinder has no commutator, no centrifugal switch, no brushes — a really trouble-free motor that will not burn out even when overloaded repeatedly. Electronically balanced within 1/50 ounce of perfection, the armature rotates at 3400 RPM without vibration — an engineering achievement that makes true precision work possible. First-grade wheels are re-balanced at our plant. Complete price, as shown,\$142.60

Clip this ad and mail for bulletins on Carbide Tool Grinder shown above and complete line of 6" - 12" general purpose bench and pedestal grinders.

Baldor

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INVESTIGATE THE DURANT LINE OF PRESS ROOM EQUIPMENT

INCREASE PRODUCTION! REDUCE COSTS!

THE SELECT-O-MATIC ROLL FEED INDEXER

Replace your present roll feed clutch with this DURANT SELECT-O-MATIC multi pawl indexer that accurately controls close feeding due to its 6720 possible stations.

Write for complete information on our line of economically priced press room equipment



ROLL FEEDS

Choose from seven different models that take stock from 2° to 5° wide — Insures accurate feeding — Reversible — Simple to install.



SCRAP CHOPPERS

Fits all power presses and has simple electrical plug in installation. Low first cost pays for itself —Pennies per day to operate.

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STOCK OILERS

Prolong die life as they clean and lubricate stock in one operation. Variety of models are available. Eliminates hand oiling yet inexpensive.



STOCK STRAIGHTENERS

Motor driven equipment (shown) is perfect for thin materials. Top rolls are adjustable for thickness. Standard straighteners also available.

Inquire about our STOCK REELS, FOOT PRESSES, COIL CRADLES, WIRE STRAIGHTENERS, and PRESS FEEDS. Complete free catalog ready now. Write today.

DURANT TOOL SUPPLY (DISSORANGESTREET, PROVIDENCES, R. I.

27. "Plant Layout," a booklet designed to aid administrating and operating executives of industry, is available from Wheeler Associates Inc., Dept. BB, 15017 Detroit Ave., Cleveland 7, Ohio. Topics cover such important phases as: the work area; how to develop a better layout; balanced motions; using gravity and drop delivery; prepositioning of tools and materials, etc. An improvement check sheet is included.

28. Thread cutting by Thread-O-Matic—the new equipment for thread and worm cutting developed by National Threading Machine Co., Dept. BB, 126 Market St., Paterson, N. J.—is explained in a bulletin issued by the manufacturer. Diagrams, specifications and claimed advantages of the process are detailed in the folder.

29. "Operation Delicate" is the story of the Matthews' Airgrit, a machine



for marking glass, ceramics, stainless steels and carbides. This descriptive folder is available from the manufacturer, Jas. H. Matthews & Co., Dept. BB. 3942 Forbes St., Pittsburgh 13, Pa.

30. A good grip with Horton face plate and boring mill jaws is claimed in Bulletin No. C-200, put out by the E. Horton & Son Co., Dept. BB, Windsor Locks, Conn. The folder also lists specifications and applications of Horton jaws.

31. "A Final Step in Tool Sharpening," Bulletin No. L-22, gives case histories on tool life. Topical divisions explain how time, tools and material are saved when cutting tools produce a consistent finish; why cutting tools often produce a nonconsistent finish; and what to do to obtain more consistent finish and more pieces per grind. The bulletin is offered by Micrometrical Mfg. Co., Dept. BB, 345 S. Main St., Ann Arbor, Mich., manufacturers of the Profilometer.



32. Operations of the Van Norman No. 12 ram-type universal miller are enumerated in Bulletin No. R12-4148 by the Van Norman Co., Dept. BB, Springfield 7, Mass. Photographic reproductions suggest the range of work and versatility claimed for the machine. Complete descriptions, illustrations and specifications of design are also featured.

33. FF magnetic dial instrument mount, with a reach claimed "to top 'em all,"

is a product of the John P. Fox Co., Dept. BB, 5514 York Blvd., Los Angeles 42, Calif. A four-page folder lists further details of this instrument mount, which is engineered for individual machinists as a utility tool.

34. "How to Run a Drill Press," a handy 32-page manual, has been published by the South Bend Lathe Works, Dept. BB, 425 East Madison St., South Bend 22, Ind. This book tells how to lay out work, set up jobs, sharpen



NEW many purpose individual Vulcanaire

DUST COLLECTING UNITS

Use on surface and other grinders where any kind of grinding dust must be removed. Salvage diamond dust.

Inexpensive, compact units, with no moving parts.

Operated from your present air supply.

Installed in a few minutes, eliminating need for costly centrally located dust collecting systems.

The collector element is mounted on the side of the machine. Quickly cleaned, requiring no refills.

Vac-suction pick-up device (vacuum nozzle) is mounted on the grinding wheel guard or close to grinding wheel on other applications. This mounting permits constant contact with dust as the wheel is moved up or down.

A simple needle valve operates the unit, and can be shut off when machine is not in use.

Available in two sizes. 700 series for grinding wheels 7" dia. or less—200 series for wheels 2" dia. or less.

"SALVAGE INDUSTRIAL DIAMONDS FOR DEFENSE"*

"That is the title of the National Production Authority's booklet which describes the growing critical shortage of industrial diamond supplies.

The shortage will soon result in idle machine tools, and lost defense production unless we straightway begin to conserve grinding wheels and salvage diamond dust. The N.P.A. fully and helpfully explains the methods for doing these things.

Request this N.P.A. booklet on your letterhead and Vulcan will be glad to send it to you. You will also receive literature on the versatile Vulcanaire Dust Collector which promotes health in your plant and turns dust into money.

> It's made by the makers of Vulcanaire The jig grinding attachment

VULCAN TOOL CO., Highland & Lorain Dayton 10, Ohio



Dynamometers
Static
Balancers
Precision
Drilling
MACHINES

TAYLOR DYNAMOMETER AND MACHINE COMPANY

528 W. Highland Avenue, Milwaukee 3, Wisconsin

drills and use drill press attachments and accessories. A companion publication, Catalog No. 5206, covers the complete line of South Bend drill presses. In addition to the Precision Model drill press, the lower-priced Economy Model and several multispindle Production Models are featured.

35. "Industrial Maintenance" is the title of another new booklet offered by Wheeler Associates, Inc., Dept. BB,

15017 Detroit Ave., Cleveland 7, Ohio. Vital topics discussed include: how to keep equipment, methods and facilities in top operating condition; check list for machinery; maintenance of methods; plant facilities, etc. Also included is a maintenance check list for evaluation of a company's existing program.

36. Technical reference charts—plastic-coated for resistance to hard usage—are handy features of the new catalog issued by American Drill Bushing Co.,

4 times as many cylinders now welded by using KNU-VISE CLAMPS



These KNU-VISE pre-set clamps* permit job to be set up now in one quarter the time—thus converting this saving of time into increased production.

Each set-up consists of clamping a ring to top of aluminum cylinder preparatory to welding.

Besides achieving fasterset-up, the KNU-VISE clamps present no interference to the welding operation as do old style clamps which had to stick up above the work to accomplish the clamping with greatest speed.

Send for our complete catalog.

PHOTOS, COURTESY CADILLAC WELDING CO. DETROIT, MICH.

Sales Offices in principal cities. Teletype DE-49

PRODUCTS LAPEER MFG. CO.
3052 DAVISON ROAD . LAPEER, MICHIGAN

Dept. BB, 5107 Pacific Blvd., Los Angeles 58, Calif. The catalog offers a "King Size" selection of drill jig bushings as well as a chart of decimal equivalents. Many sizes which were previously "specials" are now standard sizes with American.

37. Sioux portable electric tools are described in Catalog No. 52, issued by Albertson & Co., Inc., Dept. BB, Sioux City, Iowa. Products listed include the Sioux valve grinding machines, to-

gether with attachments, valve cleaners and service units, valve seat grinder sets, hand grinders and guide cleaners, insert tools and rings, electric drills, hole saws, bench grinders, flexible shafts, etc. Write for catalog.

38. How Webber gage blocks are made; their physical characteristics; how to use the accessories; care of blocks; and how to measure angles by the Webber method are problems considered in

the spiral-bound catalog published by Webber Gage Co., 12905 Triskett Rd., Cleveland 11, Ohio.

39. The Cincinnati Gilbert Machine Tool Co., Dept. BB, 3366 Beekman St., Cincinnati 23, Ohio-makers of radials, table and floor-type boring mills and accessories-briefly describe their main product features in Bulletin No. 1152. Among the catalog contents are condensed specifications and a list of representatives.

40. Kipp featherweight air grinders are shown and carefully described in Catalog No. AT-3006 by Madison - Kipp Corp., 207 Waubesa St., Madison 4, Wis. Aluminum and magnesium metals for lightness, large spindles for stability, low air consumption, controlled speeds for long life and smooth ball bearings are benefits listed by the manufacturer.

41. "Powder'd Oil" for cutting and grinding is compared with so-called



WITH FEATURES MECHANICS PREFER

Micrometer-type threads give finer adjustment and greater accuracy. Shallow "V" base with clearance cut gives better surface contact on shafting. Equipped with cross level—larger sizes also have plumb vial. Ground and graduated main vial on No. 58 with each graduation equal to .005 inch per foot. Plain vials on the No. 57.

The new Master Precision Level No. 59 has accuracy of .0005 inch per foot. Send coupon for complete information.



Lufkin Rule Company, Saginaw, Michigan, Dept. BB Send me circulars describing the new Lufkin Levels.

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Manhattan Moldisc-More use per dollar

A FRESH CUTTING FACE... throughout the life of the wheel means that Manhattan Moldiscs last longer... retain full metal removal efficiency right down to the last usable part of the wheel. The secret — Manhattan's special molded, resinoid bonded abrasive which presents a fresh cutting surface throughout the wheel thickness, and which does not load or glaze. Actual plant tests show that Moldiscs effect important savings in faster grinding time and fewer time-



outs for disc changes. For MORE USE PER DOLLAR and better quality work specify Manhattan Moldiscs. Bonded in various resiliencies from fast roughing to fine finishing. Standard size 7" x ¼" x %". For speeds to 6,000 RPM. Mounting flange and nut furnished on request.

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Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles • Teflon Products • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

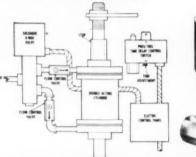
MR 943-R

Get MORE EFFICIENCY... INCREASED PRODUCTION from Air Operated Machines

Pneu-Trol Flow Valves and Time Delay Switches give air operated presses, fixtures and machines three advantages: (1) safe power stroke speed

advantages: (1) safe power stroke speed for both operator and workpiece, (2) power stroke timed at work position to permit air pressure build-up to proper work maximum and (3) fast return stroke. Ideal for arbor, drill and punch press work, burnishing, spinning, metal cutting, etc. Diagram below illustrates a typical Flow Valve, Time Switch setup.







(Above) Time Delay Switch and (Left) Flow Valves are compact, permit

installations

Pneu-Trol Devices, Inc.

1440 N. Keating Ave., Chicago 51, Ill.

"hoss'n buggy" techniques in a pamphlet by Henry E. Sanson & Sons, Inc., Dept. BB, 145 Quaker Ridge Road, Manhasset, Long Island, N. Y. The product is claimed to be the answer to coolant problems.

42. How to produce a perfect thread is illustrated in Bulletin No. 110-D by Rivett Lathe & Grinder, Inc., Dept. BB, Brighton 35, Boston, Mass. Also shown are the successive operations of an indexing system which presents

each of ten cutter teeth to the work to form the thread.

43. The Gisholt 1953 catalog presents the redesigned and restyled version of their standby, the Simplimatic automatic lathe. The Gisholt Machine Co., Dept. BB, Madison 10, Wis., also includes details of 31 tooled applications in the 16-page bulletin.

44. A fact-packed brochure, designed to serve as a ready reference for designers, tool engineers, production

NELCO Carbide-Tipped 3 FLUTE END MILL

did this job in 1/6th the 7ime

New NELCO 3 FLUTE Carbide-Tipped End Mill:



- Plunges into solid metal and mills Will bore hole and mill in one operation.
- Eliminates Chatter
 —providing smoother
 cutting—a better job
 in astonishingly reduced time.
- Mills so smoothly that a finished cut is either not required at all, or to a much leaser degree.
- Stays sharp much longer—doesn't require resharpening as often.
- Provides Cooler and Freer Milling — More CHIP room decreases the chance of work overheating and twisting.

This tool is manufactured for use on all types of alloy steel, cast iron, brass and bronze. Sizes ranging from "" to 2" diameter.

and did it Better!

One of the objective tests used by Neleo Engineers was the cutting of a "keyway". (Results illustrated below.) End Mills compared were high-speed steel and Neleo's new earbide tipped 3 FLUTE. Material was S.A.E. 1095 steel shafting. End Mills were ½" in diameter; a 3 H.P. milling machine was used in both cases; 2400 R.P.M. and 14" per minute feed was used for the carbide; 609 R.P.M. and 3" per minute feed for the high-speed steel.

OPERATIONAL RESULTS:

To complete the Job using highspeed steel end mill.



NOW COMPARE NELCO RESULT!

Job completed using Nelco's new carbide tipsed 3 Flute End Mill.



NOTE: ABOVE TEST PHOTOS UNAFFOUCHED



SAVE hundreds of valuable production hours by giving the Nelco Field Engineer a few minutes of your time! Let him show you how Nelco Carbide-tipped Milling Cutters. End Mills and Twist Drills are lowering production costs for others.

Write for address of your Nelco Field Engineer

NELCO TOOLS

4or that extra edge in production
NELCO TOOL CO., INC., Manchester, Conn.



SHUR-LOCK ADAPTER ASSEMBLIES

FIGURE NO. 1

Made to GMC, Ford and Chrysler Standards.

Friction type Shur-Lock micro nut locks any place on adapter threads without damage.

Relieved against possible swelling around Woodruff key, without destroying bearing surface.

Easy adjustment saves set-up time.

National Acme threads afford maximum bearing surface for better fit in spindle.

Widely acclaimed for concentricity. Runout held to absolute minimum.

All sizes $\frac{1}{2}$ " to $1\frac{7}{8}$ ", 0 to number 4 Morse Taper now in stock for immediate shipment.

Specifications shown on forms No. 141 our catalog

New Low Prices

Pictured at the left are other typical Seibert engineered items including: (2) Slip spindle assemblies, (3) Universal joints, (4) Lower joint assemblies, (5) Upper joint assemblies, (6) Pinion drive shafts, (7) Bracket spindle assemblies, (8) Arms.



& SONS, Inc.

supervisors and others interested in production-increasing applications, is obtainable from The Nelco Tool Co., Dept. BB, Manchester, Conn. Nearly 800 carbide tools, regularly maintained in stock by Nelco, are described in the 48-page catalog.

45. The sequence of operations of the Stamets coupling tapping machine is enumerated in Bulletin No. 100-C, put out by Wm. K. Stamets Co., Dept. BB-CT, Jenkins Arcade Bldg., Pittsburgh

22, Pa. Illustrations of the machine are supplemented by construction data and specifications.

CHENOA, ILLINOIS

46. Details of the latest type of production screw driving equipment are contained in the catalog of Cook & Chick Co., Dept. BB, 640 S. Miller St., Chicago 7, Ill. Their multiple machines, although considered standard, are fitted at the factory with parts to suit the user's requirements.

There's a reason 71%*

of all popularly-priced Tool and Cutter Grinders sold in 1951 were "Knock - Outs"



47. Applications of the Pyro surface pyrometer are listed in Catalog No. 168 issued by The Pyrometer Instrument Co., Inc., Dept. BB, Bergenfield 3, N. J. Designed for both surface and sub-surface temperature readings, the instrument is said to be adaptable to all industrial and laboratory requirements.

48. The Hall "True Check" drill point gage is suggested by the manufacturer as the solution to vexing drilling prob-

lems. Instructions on how to use the instrument are in a descriptive bulletin released by the Hall Engineering & Mfg. Co., Dept. BB, 3039 Alcott Ave., Flint. Mich.

49. A total of 1815 standard gages are said to be available from Size Control Co., Division of American Gage & Machine Co., 2510 W. Washington Blvd., Chicago 12, Ill. Write for Catalog No. 53 for description of the Size Control regular line and specialties.



Cool, expanded air and light weight provides easy handling. High rpm permits use of small diameter wheels—savings in wheel costs. Grease packed for life bearings—provide minimum of maintenance. For the toolroom, dieroom and assembly line.

ONSRUD MACHINE WORKS INC. 3908 Palmer Street write for Bulletin 1129





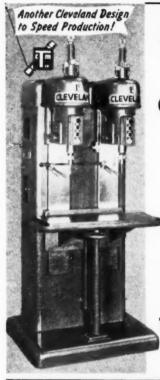


50. Suggestions for use and application of Stadoil diamond lapping oil for diamond wheels and laps are contained in literature of the Stadoil Mfg. Co., Dept. BB, El Monte, Calif.

51. The Reckermann universal milling machine, Model FU 1000, is illustrated with accompanying specifications in Bulletin RB. The firm's American agent is Karl A. Neise, Dept. BB, 381 Fourth Ave., New York 16, New York.

52. A chart of bend allowances for computing developed lengths of blanks is obtainable from R. J. Rizzo Technical Services, Dept. BB, Engineering Bldg., 114 Liberty St., New York 6, N. Y. Price is 20 cents.

53. "Pattern for planning a control center" is an informative feature contained in Bulletin No. 793, now available from Allen-Bradley Co., Dept. BB, Milwaukee, Wis. This 28-page bulletin contains a comprehensive ex-



SPEED UP

YOUR TAPPING WITH A CLEVELAND DUPLEX!

The Cleveland Model E0 Duplex Lead Screw Tapping Machine does small hole tapping with a speed and precision equal to many larger machines! With separately operated spindles set-up and change-over time is eliminated on many jobs with a wider range of work made possible. Multiple heads for tapping groups of holes may also be used.

Whatever your tapping problems Cleveland has the machine to speed production and cut costs—or can design it for you.

Write for Catalog No. MB-35

THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.

CANTON 6, OHIO



planation—from the purpose to the construction—of multi-unit control centers.

54. Positive control for depth of hole is claimed for S-J drill stops, described in Bulletin No. 18-50 by Scully-Jones & Co., 1907 S. Rockwell St., Chicago 8, Ill. These tools are listed as a combination holder, driver and stop for use in radial drills, drill presses and turret lathes to control cutting depth of drilis, end mills and similar tools.

55. Normalized cast iron tooling standard shapes—ground parallel and square for jigs, fixtures, tooling and special machine applications—are products of Great Western Steel Co., Inc., Dept. BB, P. O. Box 4937, Florence Station, Los Angeles 1, Calif. A shape chart and price list will be furnished on request.

56. Cedar-West Tool Co., Inc., 90 West St., Dept. BB, New York 6, N. Y., are distributors of the "Ottmann" punch



Speed up Production!

Feed Parts

- Single File
- In Oriented Position
 - Automatically
- At Controlled Rates



SYNTRON

PARTS FEEDERS

INCREASE CAPACITY of grinders and presses, inspection and packaging devices, and other automatic processing equipment. Feed without damage, parts of most sizes, shapes and materials at reduced costs. WRITE today for Free Catalog Folder, or send details of your problem along with sample parts for testing to . . .

SYNTRON CO.
300 Lexington Ave. Homer City, Pa.

and form shaper, which has been developed for the manufacture of punches with punch and base plate made of one solid piece.

57. The Claud S. Gordon Co., Dept. BB, 3000 South Wallace St., Chicago 16, Ill., has issued a new, copyrighted, 32-page illustrated booklet entitled: "Taking the Mystery out of Foundry Sand Control." The booklet covers the selection of molding and core sands, the various

physical properties and their control.

58. A new "Sheet and Plate Fabrication" brochure has been issued by The Kirk & Blum Mfg. Co., Cincinnati, Ohio. It contains over 40 pages of illustrations of the fabricating plant and manufacturing facilities. The booklet also gives a comprehensive view of many of the typical parts and products the firm regularly manufactures.

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hatever the material or job, rely on Parker for new marking ease and economy. Steel stamps and marking dies for every purpose are painstakingly designed and crafted by Parker to afford clean, permanent impressions. Parker's engineering ingenuity assures marking tools of unrivaled quality and durability-lasting legibility-superb performance, with the 1000th impression as sharp as the first. Special symbols, trademarks, coding-all can be made to your specifications, enlarged or reduced from your drawings with precise accuracy. Special applications requiring marking on flat, concave, convex or irregular surfaces can be engineered with the perfection for which Parker has become famous. For present needs and future reference, send now for the informative new Parker catalog. Investigate the flexibility of Parker's facilitiesdiscover how Parker can benefit you with more profitable, productive marking.



59. A new, condensed 8-page Famco catalog has just been published since the moving of Famco Machine Co. from Racine. Wis. to its new, enlarged production facilities in Kenosha, Wis. The catalog includes the complete Famco cost-cutting machine line of: air presses; arbor presses; band saws; drill presses; foot presses; power presses; and squaring shears.

60. How to gouge and cut all metals with only carbon arc and compressed air, is described in a new brochure on the "Arcair Torch" available on request from the Arcair Co., Dept. BB, 2614 Burwell St., Bremerton, Wash.

NEWI position material securely

-in SECONDS!

AMF FLOAT-LOCK SAFETY VISES

extend the usefulness of your drill presses and band saws. Reduce material spoilage, prevent tool damage...save money. Insure fast, safe, accurate work.

FOR YOUR DRILL PRESS, Float-Lock is a full-floating vise for all set-ups in tool rooms and production. Locks instantly anywhere on table ... becomes a dependable drill jig. Turns over on three sides for maximum flexibility. Eliminates timewasting clamps, straps, bolts.

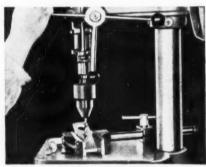
FOR YOUR BAND SAW, Float-Lock safely and securely holds all shapes and thicknesses of materials. Cutting to close tolerances made easy without hands touching material...simplifies compound angle cutting. Ideal for automatic chain-feed operation.

Order from your industrial supply distributor or write for illustrated folder to: Wahlstrom/Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Avenue, New York 17, N.Y.

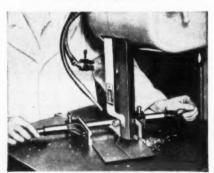




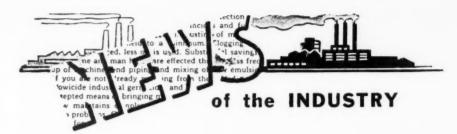
Ideal for centering and end drilling



Perfect for angle drilling



Cutting irregular shapes made easy



Western metal exposition has 271 exhibitors

Enlarged beyond original plans, the Western Metal Exposition, Mar. 23-27 in Los Angeles, has attained standards and dimensions which make it the largest important display of metals and machinery yet blueprinted for the Pacific Coast, it is claimed.

Committees in charge made this statement with the declaration that 271 firms have entered exhibits. So many concerns are in the show that the exposition will be held under two roofs—Pan-Pacific auditorium and adjacent Pan-Pacific Pavilion—to be connected with runways. On the same dates technical sessions of the Western Metal Congress will take place in Los Angeles' new Statler hotel.

George R. Weber dies

George R. Weber, vice-president, treasurer and a director of Raybestos-Manhattan, Inc., and general manager of its U. S. Asbestos Division plant at Manheim, Pa., died January 14.

Clay Hendricks has been promoted to district manager of the Chicago area for DeWalt Inc., subsidiary of American Machine & Foundry Co.

George A. Gade, manager of outside sales for Standard Pressed Steel Co., has been made vice-president in charge of sales by the Jenkintown, Pa., firm.

Appointment of Hans K. Reitz as factory manager is announced by Arvid Lundell, president of Colonial Broach Co., Detroit manufacturers of broaching machines and tools.



Geo. A. Gade



C. Hendricks

The Hydraulic Press Mfg. Co. of Mount Gilead, O., reports the promotion of H. J. Zilske to chief engineer of the hydraulic power division. He



H. J. Zilske



Hans K. Reitz

has been active in the field of hydraulics since 1936, and has had experience in the installation and service of hydraulic equipment.



S. Auchincloss



Wm, G. Huseby



John F. Burg



F. G. Crosby, Jr.

Samuel Sloan Auchincloss has been elected president of DeWalt Inc., subsidiary of American Machine & Foundry Co., Lancaster, Pa.

According to an announcement by Ralph W. Burk, vice-president in charge of sales of Kearney & Trecker Corp., Milwaukee, the following new appointments are effective: J. Robert Jones, sales manager for standard machine sales; Henry H. Lentzner, manager of the firm's new special ma-

appointments are effective: J. Robert Jones, sales manager for standard machine sales; Henry H. Lentzner, manager of the firm's new special machinery division; William G. Huseby, assistant sales manager; Morris L. Hutchens, chief engineer, and Harold W. Kippers, sales manager of the special machinery division; Fred G.

Crosby, Jr., assistant branch manager at Detroit; John F. Burg, sales engineering representative in White Plains, N. Y.; and Alfred T. Hostvedt, sales engineering representative at Syracuse.

O. W. Acheson has been appointed manager of manufacturing for Lamson

Corp., Syracuse, N. Y.

John H. Fassett, manager of the clutch division, the Hilliard Corp., Elmira, N. Y., was elected a vice-president of the corporation at a recent meeting of the board of directors. Mr. Fassett joined the company in July, 1939, and will continue as manager of the clutch division in charge of sales,



J. R. Jones



A. T. Hostvedt



John H. Fassett



O. W. Acheson

REDUCE DRILL BREAKAGE

with full length bearing precision bushings, O.D. ground true to I.D. \bullet We specialize in hole sizes #80 to $\frac{1}{2}$ ", in any body size. Other sizes to your specifications. Production small hole drilling, our specialty.

Write for catalog and quotations.





TREE

Taper boring tool

You can get your taper hole jobs done in a hurry and save set-up time, too . . . with the TREE TB-4. So versatile that it can taper bore up to 10" in diameter and can be used on your mill, jig borer or boring bar. . . . Precision ground for accuracy . . . Simple to use.





Straight Boring

The TB-4 can be used as an offset boring tool for jig and fixture boring.



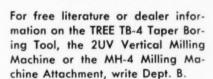
Facing

Faces up to 10" in diameter; Graduated swivel base set at 90°.



Outside Turning

Straight or tapered outside turning with the extension bar.



Export Address: States Trading Co., 401 Broadway, New York 13, N. Y. Cable "Stradeso, New York."

TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE RACINE, WISCONSIN



Investigate, too, This Aid to Production

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Make the Most of These Distinct Advantages

For the most favorable results, time- and profitwise, use Motch & Merryweather's superb coolant. Anti-weld, averting pick-up. Sharper tools and longer-lived. Oily, but not "greasy". Smokeless, odorless. A real aid to money-making production.

stock feed. Capacity—up to 3" dia. tubes or shapes. Get full details.

ends accurate to length with the Triple-Chip

method. Available in automatic or manual

For any ferrous or non-fer-

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nesium. Square. burrless

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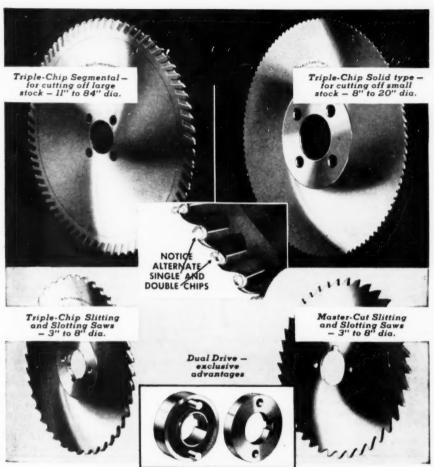
PRODUCTION - WITH -ACCURACY MACHINES AND EQUIPMENT .

New quarters for Modern Machine Tool Co.

View of new quarters of the Modern Machine Tool Co., Jackson, Mich. Automatic cutting-off machines and safety drill tables are among products now being manufactured in the attractive new structure.



ALL 3:



TO CUT OFF STOCK, SLIT OR SLOT, THE MOTICH & MERKYWEATHER TRIPLE-CHIP SAW BLADE OFFERS MANY EXCLUSIVE ADVANTAGES

Fast, burrless cut-off and slitting or slotting with with Dual Drive which makes stresses and breakage negligible. Let M&M Triple-Chip saw blades give you the higher production-with-accuracy which Industry must attain and maintain today. Also Master-Cut conventional type with M&M's exclusive Dual Drive. Ask your dealer.



THE MOTCH & MERRYWEATHER MACHINERY CO. 715 PENTON BUILDING . CLEVELAND 13, OHIO ... IT'S THE COST PER CUT THAT COUNTS...



FOR YOU with THE HALL TRUE CHECK DRILL POINT GAGE



At the right is a .625 drill which actually cut a .640 hole. The same drill was ground to cut .625 and checked accordingly on the Hall True Check Drill Point Gage.

Here's a gage which will add dollars to your profit statement. And it will give you all the other advantages mentioned above. Now you can inspect and qualify your reground drills with precision and ease. The Hall True Check Drill Point Gage is patented, tested and proven. Let us demonstrate this gage in your own plant and then you decide how this equipment can help you. There is no obligation. Meanwhile, write for full details and illustrated

.625

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— Phone 9-4305 —

Reviews of New Technical BOOKS

Advanced Mechanics of Materials

By Fred B. Seely, M.S., professor emeritus of theoretical and applied mechanics, and James O. Smith, A.M., professor of theoretical and applied mechanics, University of Illinois. Second edition. John Wiley & Sons. Inc., New York. 680 pages. \$8.50.

This book was prepared primarily for advanced undergraduate and first year graduate students in engineering, although in selecting the topics and methods of presentation, the needs of design and research engineers are met. Where differential equations are involved in the analysis, their solutions are obtained and the results, for a rather wide range of conditions, frequently are presented in the form of tables or curves. Numerical methods which are usually effective in the solution of differential equations for some combinations of physical conditions encountered in the analyses of this subject are not emphasized in this book. Much new material has been added in this, the second edition, since the first appeared twenty years ago. Although methods of analysis are given careful attention throughout the book, equal emphasis is given to the engineering evaluation and interpretation of the analyses as influenced by the assumptions made and principles used.

The World of Eli Whitney

By Jeannette Mirsky & Allan Nevins. Published by The MacMillan Co., 60 Fitth Ave., New York 11, N.Y. 346 pages. \$5.75.

The fame of Eli Whitney as the man who invented the cotton gin is recognized, yet his importance extends far beyond that. He was a man of ideas, an important contributor to the Industrial Revolution in America and the father of mass production.

It was Whitney who developed standard interchangeable parts for the

Step up Production with _ SURE GRIP



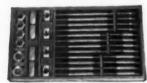
SURE GRIP STEP BLOCKS

FOR MILLERS — SLOTTERS

JIG BORERS — PLANERS

RADIAL DRILLS — LATHES

and
HANDY
STUD SETS



Stud sets consist of 40 pieces and provide requirements for at least 4 clamps from 3" to 15" high with T nuts for your table slot.

there's a size to fit your machine

like this . . .

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315-317 N. MAIN ST. . DEPT. A . ENGLEWOOD, OHIO

musket, not only inventing the specific tools, but also pioneering in manufacturing processes and in using unskilled labor. He needed government support for his ideas, and he had to fight to get it. But Whitney had allies, among them some of the most famous men of his day: Jefferson gave him a patent for his musket; Robert Fulton was a close friend; he knew personally the presidents of his time; and he worked with the political and military leaders

interested in stimulating our economic independence by fostering domestic manufacturers. Whitney's career was brief, but his pioneer activity in tools, machines and methods has had a mighty sequel in Colt, Singer, McCormick, and Henry Ford.

The basis of this important biography, the only modern study of Whitney, is the hitherto unpublished collection of family papers. Wherever possible,



Whitney's personal story is told in his own words.

Technical Reporting
By Joseph N. Ulman, Jr., writer, teacher,
Massachusetts Institute of Technology. Henry
Holt and Co., Inc., New York, 289 pages, \$4.75.

This practical handbook shows how to convey information and ideas accurately and efficiently, using the techniques perfected by modern industry and science. The basic object of the volume is to teach correct oral and written communication within the framework of specialized sciences and professions.

Whether preparing a record of experimentation or research, or writing an interoffice memorandum in a large business concern, practical guidance will be found throughout this nonscientific book. Each phase of technical reporting is discussed and illustrated.

The writer is by training and experience both a writer and an engineer who has been engaged for many years in writing and editing engineering reports and articles. After graduating from John Hopkins, he went to work as an engineer at the General Motors proving ground; later he was on the technical information staff of the Ethyl Corp. research laboratories and in 1947 joined the faculty of the Massachusetts Institute of Technology as assistant professor of English.

Non-Ferrous Physical Metallurgy

By Robert J. Raudebaugh, professor, Georgia Institute of Technology. Published by the Pitman Publishing Corp., 2 West 45th St., New York, N.Y. 345 pages. \$6.50.

It is the purpose of this book to discuss the more important non-ferrous metals from the aspect of physical



THESE EXTRAS ARE AVAILABLE

Slotting Attachment Vertical Head Dividing Head Rotary Table

Space Attachments

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metallurgy. Particular emphasis is placed on recent developments in their processing, fabrication, and application. For example, covered are such developments as: the melting and casting of reactive metals such as molybdenum; direct casting of billets and slabs of aluminum, magnesium, and copper alloys, the fabrication of ductile titanium; and the application of powder metallurgy to the production of nonferrous parts.

Progress in metallurgy has occurred at an extremely rapid rate in recent years. This is true of both the phase dealing with extraction of metals from naturally-occurring raw materials (production metallurgy) and that concerned with the subsequent adaptation of the refined products to the use of man (physical metallurgy). This volume gives an insight into some of the newest developments.



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Statistical Quality Control

By E. L. Grant, professor of economics of engineering, Stanford University, McGraw-Hill Book Co., Inc., New York, 557 pages, \$6.50. Second edition.

In recent years statistical methods have been used successfully in nearly all types of manufacturing to improve product quality and to reduce the cost of spoilage, rework, and inspection. Shewhart control charts and various types of acceptance sampling procedures based on the laws of probability

have proved particularly useful and have been widely applicable. Not only a textbook, it is also a practical working manual. The second edition provides up-to-date coverage of the field. It includes numerous examples chosen from many different types of manufacturing with each example carefully selected to bring out one or more important principles.

Changes in the second edition include: a rewriting of the last seven

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chapters for the incorporation of new material, particularly on acceptance sampling; more than double the number of problems in the first edition, with 30% of answers given; inclusion in the appendix of the master tables from "Military Standard 105A2, Sampling Procedures and Tables for Inspection by Attributes" and a table of representative factors.

Some outstanding features include: clear expository style; numerous examples from many different industries; unusually complete coverage of control charts and acceptance-sampling procedures and use of only elementary mathematics.

How to Run a Lathe

South Bend Lathe Works, South Bend 22, Ind., 49th edition. 128 pages.

One of the great needs of industry today is well-trained workmen who are skillful with their hands and also trained to think about their work, diagnose troubles and suggest improvements. It

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is the purpose of this book to aid the beginner or apprentice in the machine shop and the student in the school shop to secure a better understanding of the fundamentals of the operation of a modern screw cutting engine lathe. In illustrating and describing the fundamental operations of modern lathe practice, the book seeks to show only the best and most practical methods of machine shop practice in use in modern industries in America.

This 49th edition is printed in English,

French, Spanish and Portuguese. The first edition, in English, was printed in 1907. Each succeeding edition has been revised and improved.

Tool Steel Handbook

Allegheny Ludlum Steel Corp., Pittsburgh 22, Pa. 197 pages.

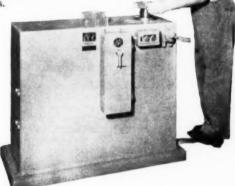
This is a relatively complete picture of the Allegheny Ludlum tool steels, their properties and treatments and the special forms in which they are available.

The book begins with charts and

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tables giving specific and comparative data on properties, analyses and applications. This is followed by detailed descriptions of all important grades, arranged alphabetically for easy reference. The next chapters describe the many forms and finishes available from Allegheny and certain allied products such as carbides. The final sections comprise an extensive discussion of heat treating and handling techniques as applied to tool and high-speed steels

and a complete set of weight tables and other useful reference material. A comprehensive table of contents and a detailed index round out the usefulness of the volume.

Die Casting

By Charles O. Herb, editor of "Machinery." metal working magazine. Published by The Industrial Press, 148 Lafayette St., New York 13, N.Y. Second edition. 310 pages. \$4.50.

Die casting from its early phases up to today's advanced practices is thoroughly covered in this second edi-



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tion. The chapters relating to die casting machines, die casting alloys and steels for dies and die components include the latest developments in these fields, and new examples of unusual die castings are described.

The latest models of automatic and manually-operated die casting machines are illustrated, including fully hydraulic machines of the vertical and horizontal cold chamber types, air-operated vertical machines, machines

convertible from cold chamber to gooseneck operation, etc.

In the chapter on alloys, convenient tables of compositions and properties are supplemented by text discussion of their applications. The chapter on steels for die casting dies presents these data in tabular form to aid the die designer in the selection of the proper type of steel for each die component. Detailed descriptions of dies for parts ranging from simple shapes to complex forms

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are illustrated, and to further aid the designer there is a section covering the die design standards used by a leading manufacturer of die castings and die casting equipment. The dies described have been classified in groups according to their most distinguishing characteristic to facilitate locating a general design or type of die adapted to a given class of work.

Basic Sheet Metal Practice

By J. W. Giachino, head, vocational-industrial and technical education department, Western Michigan College of Education; published by Laurel Publishers, 325 Ash St. Scranton, Pa. 245 pages, 351 illustrations.

This is an excellent book for those who either want a general knowledge of the sheet-metal trade or want to perform all of the operations themselves, particularly as a hobby, or as



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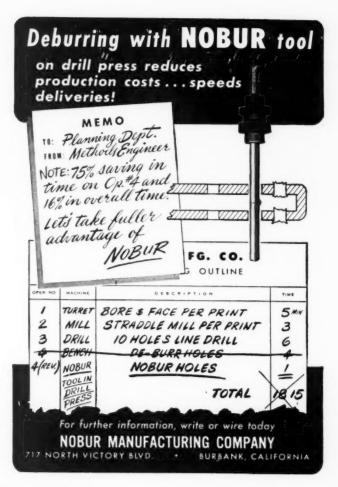
a unit in a home workshop.

In step-by-step fashion it covers such fundamentals as measuring, laying out patterns, cutting, bending, forming, pressing edges and seams, drilling, filing, notching, raising metal, soldering, riveting, flanging, burring, and radial and parallel line development. Also included are descriptions of sheetmetal tools and machines plus the correct method of using them.

Containing 351 illustrations and valu-

able related information tied in with the instructions, plus ample practice material and 35 useful projects, this is an easy book to use. A working drawing is provided for each of the projects.

The author has had many years of experience both as a teacher and supervisor in public schools and college, and as a worker in the metal trades. He has written numerous technical books dealing with sheet metal and related subjects.



Methods of Applied Mathematics

By F. B. Hildebrand, Associate Professor of Mathematics, Massachusetts Institute of Technology, Published by Prentice-Hall, Inc., 70 5th Ave., New York. 523 pages. \$7.75.

The principal aim of this volume is to place at the disposal of the engineer or physicist the basis of an intelligent working knowledge of a number of facts and techniques relevant to four fields of mathematics which usually are not treated in courses of the advanced calculus type, but which are useful in varied fields of application. The text includes the result of a series of revisions of material originally prepared in mimeographed form for use at the Massachusetts Institute of Technology.

In each chapter, the treatment consists in showing how typical problems may arise in establishing those parts of the relevant theory which are of principal practical significance, and in development of techniques for analyti-

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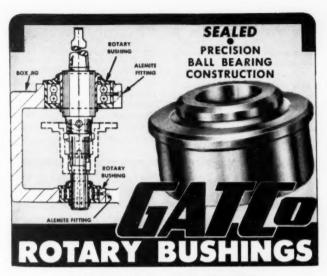
Theory of Elasticity and Plasticity

By Harald M. Westergaard, late Gordon Mc-Kay, professor of civil engineering at Harvard University. Published by John Wiley & Sons and the Harvard University Press. 176 pages. \$5.00.

The third book in the Harvard Monographs in Applied Science, this new volume offers significant contributions

to the field. Following a concise historical introduction, the book presents the fundamental concepts and mathematical relationships of the theory of elasticity, including stress, strain, displacement, Hooke's law, and the basic equation of elasticity. Some of the special topics treated are Lamé's stress ellipsoid, Mohr's circles, octahedral stress and strain, compatibility, cylindrical coordinates, and the simplest laws of plasticity.

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of elasticity to certain types of problems are then offered, and such tools as the strain potential, the Galerkin vector, and the twinned gradient are used. Among the other problems discussed are hollow cylinders and spheres, rotating discs, thermal stresses, the problems of Kelvin, Boussinesq, Cerruti, and Mindlin, as well as problems involving cavities and deflections of surfaces.

Before his death in 1950, Harald M. Westergaard successfully applied the

great potentialities of the mathematical theory of elasticity to many practical engineering problems. He was universally regarded as one of the leading authorities in his field.

Economics of American Manufacturing

By Edward L. Allen, staff research director of joint Air Force-Navy projects, and lecturer in economics at The American University, Washington, D.C. Illustrated with 208 photographs and 68 diagrams. Published by Henry Holt & Co., N.Y. 566 pages. \$6.95.

A penetrating cross-section view of American industry. Nineteen representative industries are examined within five general categories: basic metal, basic non-metallic, metalworking, textile and allied, and consumer specialty. Included within these groups are automobiles, machine tools, aircraft, agricultural implements, leather goods, cotton textiles, synthetic fibers, food, beverages, tobacco, furniture, and other components of America's techno-

Following an introductory chapter on the place of manufacturing in the American economy, the author analyzes each industry from three standpoints: its setting in the national economyrelative size and importance, use pattern of the product, export-import relationships, and relations with the federal government: structure of the industrycorporate ownership and control, lo-



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cation and capacity of plants, technology of manufacture, and input and cost factors; and financial factorsprices and pricing policy, profits, and future outlook. A concluding chapter is devoted to sources of industry data and an extensive bibliography.

Machine Shop Tooling, 1953 Edition

by Charles C. Williams. Published by Wilco Press, 3326 N. Bailey St., Philadelphia 29, Pa. 342 pages. \$3.00.

Here is a book of tables and charts that should be of use to every machinist, foreman and metalworking engineer. It contains complete data for every machining operation encountered in the modern shop. Feeds, speeds, cutting angles, coolants—for every type of machine tool and for every type of metal-are listed and tabulated. There are tables on general wheel recommendations for average shop work, drill and thread tables, suggestions for eliminating grinding, drilling, milling, etc., troubles. Book contains specific recommendations for turning tools, drills, taps, milling cutters, threading, spe-cial threads, etc. All basic materials are covered, from aluminum to zinc. Best methods of machining these various metals are suggested. The book is indexed for handy reference.

Corrections: 1953 Directory

Several errors crept unwittingly into the 1953 BLUE BOOK Directory. With a red face the corrections are herewith noted.

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Industrial Diamond Eng. Co., 870 58th St., Brooklyn 20, N. Y. DIAMONDS AND DIAMOND TOOLS

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Model 1-A Vernier Callipers. .001" accuracy for inside, eutside, 516.25—and \$1.00 for dynahide cover. Made in Sweden constructed from special alloy steel, hardened to minimum Rockwell C-60. Clearly engraved calibrations, extra-heavy beam and smooth-sliding fit of moving jaw assures accurate, positive measurements. guaranteed to cheek out for accuracy threughments. guaranteed to cheek out for accuracy threughments. German Mauser-type Calipers from \$7.50.

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Taylor-Winfield Corp., Warren, Ohio WELDERS, butt; resistance; seam; spot; portable

The address for the American Drill Bushing Company is incorrectly given as: 1110
S. Santa Fe Ave. The correct address is:
American Drill Bushing Co.

5107 Pacific Blvd., Los Angeles 58, Cal.

The address and name of **Brookfield** in the Directory should read:

Brookfield, Inc.

755 Boylston St., Boston 16, Mass.

Enlarged quarters for milling manufacturer

Reed - Prentice Corp., Worcester, Mass., recently completed a new factory building which adds 23,000 square feet of space for the assembly of large vertical milling machines.

Tool companies combine

Emerson Electric Mfg. Co., St. Louis, Mo., has purchased The United States Electrical Tool Co. of Cincinnati and Williamsburg, O. It is the intention of Emerson to operate the property as a division of the company and its official designation will be: The Emerson Electric Mfg. Co., United States Electrical Tool Division.

At present, the new organization is being oriented to the use of the same general systems in sales, engineering and manufacturing departments, so all activities will be coordinated in St. Louis.

Harry C. Levenson, who was manager of the U. S. plant, will continue as division manager. Other members of the organization are being retained in their former capacities, and job functions will be changed to fit into the Emerson Electric organization pattern as rapidly as possible.

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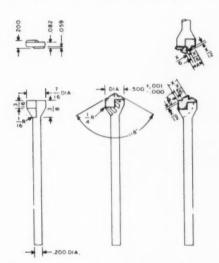
Carbide-Tipped Fluteless Drill for Plastics

By W. H. Dickinson,

Headquarters Mig. Eng. Dept., Westinghouse Electric Corp.

In the past few years the development of plastics for industrial use has moved at an extremely fast pace. The new plastics which incorporate mineral fillers and special binders have brought about an increasingly difficult job of drilling. The harsh abrasive action of the fillers generally means short life for the cutting tool.

To overcome this objection and to get an even better drill for the purpose, Robert Double, Westinghouse manufacturing engineer, set about developing a drill specifically for hard or abrasive plastics. In order to get adequate tool life, it was soon determined that it would be necessary to have tungsten carbide tips in the drill.



Sketches of typical carbide-tipped drill for plastics. Note: after brazing, cross section of steel head should be blended to contour of carbide tip for chip flow. Do not remove more stock than necessary.



Drilling plastics with spiral drill is slow, hard on drills; new type drill (lower) is much cheaper, faster, better.

However, he found that flutes such as are found on standard twist drills were a detriment in the drilling of plastics. The flutes continually clogged with chips, thus preventing deep hole drilling unless the drill was frequently

withdrawn for chip clearing. As the flutes clogged with chips and gum deposits, the friction on the drill increased considerably and the drill soon overheated. This overheating reduced tool life. Mr. Double decided, therefore, to make a drill without flutes.

After much experimentation it was found that a spade head drill with a shank 40% of the diameter of the nominal hole size produced a drill with optimum qualities. If the shank was smaller than 40% of the drill diameter, it became too weak and twisted off under heavy feeds. If the drill shanks were larger than 40%, it did not allow sufficient clearance for chips.

The resulting drill bit is a piece of pre-formed tungsten carbide brazed into a slot cut in a minimum amount of supporting tool steel on the end of a relatively small shaft. It was found that the drill could successfully cut plastics and other relatively soft ma-

terials, such as wood fiber, at amazing speeds and with very long tool life. Many holes have been drilled to ten or twelve drill diameters in depth without retracting the drill. This, of course, is far beyond the depth normally considered to be deep-hole drilling. For normal usage in the shop it is recommended that the drill be run at the highest speed of the drill press and fed by hand at a very rapid rate.

"Notched drill grind," another development of the laboratory of some years back, has been introduced into the grinding of the drill. Basically this consists of grinding small notches into the cutting lips of the drill bit in such a way that the notches on opposite sides of the drill center do not cut in the same circle. The dimensions or spacing, however, are not at all critical. The notches are very quickly and easily ground into the drill by hand on the reduced edge of a silicon car-



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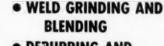


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bide or diamond grinding wheel. The "notched drill grind" very materially increases the life and cutting efficiency of the drill.

Thus far the fluteless drills have been produced only in relatively small quantities for field trial use.

Westinghouse has not patented the drill and does not intend to do so. The sole aim has been to develop a tool which would be useful to industry at large in the drilling of plastics which

are particularly abrasive to cutting tools. At the present time the Wendt-Sonis Company of Hannibal, Missouri, a producer of high quality drills, is considering the commercial possibilities of the drill.

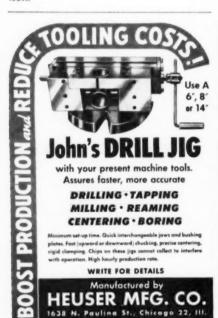
New silicone lubricant

Molykote-Silicone, Type 77, a new lubricant said to be particularly adaptable for use on synthetic rubber, plastics, leather, nylon and fibre bearings and all metals, has been announced by The Alpha Corp., Dept. BB, 179 Hamilton Ave., Greenwich, Conn.

This is a grease compound containing as a major constituent Molykote, Type Z powder, which is processed with a high grade silicone fluid and stabilizer.

Combining the features of silicone lubricants with the extreme bearing pressure lubricity of Molykote, it has an operating range for temperatures of —50°F to 400°F, for occasional peaks up to 600°F. Above temperatures of 600°F the silicone will volatilize, leaving Molykote impregnated on the surfaces for effective lubrication up to 800°F.

It is chemically inert to rubber, plastics, leather, nylon, fiber and metals; is very resistant to oxidation and is not subject to gum or varnish formation.



Mechaneers acquire added facilities

Mechaneers Inc. of Bridgeport, Conn., announces the acquisition of Plant No. 3 at Bridgeport Municipal Airport. This facility consists of 31/2 acres of land and three buildings located adjacent to the field. John A. Frink, president, states that this increase in productive space should permit rapid delivery of all types of aircraft assembly jigs, tools, dies and metal and fabric-covered assemblies and surfaces. Location on the airport should also enable maximum utilization of the firm's fleet of planes and assure prompt delivery of rush requirements, as well as immediate, on-the-spot availability of any of the 150 aircraft tooling specialists of Mechaneers' contract engineering division.

John W. Thees recently became works manager of the Doehler-Jarvis Corporation's Toledo plant No. 1, and Charles I. Hodgson now holds the same position at the firm's Toledo plant No. 2.

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Modeling clay for lathes

By Clifford T. Bower

The modeling clay dealt with in this article is the non-setting, artist's variety which is sometimes made up into multi-colored sticks as a constructive toy for children. It can be obtained for industrial use in 1 lb. blocks. The material is always plastic and will adhere to any dry surface from which all traces of it may be removed with a few spots of gasoline. Warmth will soften it and improve its plasticity, which can be increased further by working in a little petroleum jelly.

Its uses in industry are considerable in number, but the writer is confident that its uses in lathe work, as given in this article, are original,

1. This shows the application of modeling clay for locking the thimble of a micrometer to the barrel, in order to retain a desired reading. The same method can be used when a lathe operator is checking finally a batch of work before submitting it for inspection. The micrometer is first set to the high tolerance limit and locked at this setting by means of a piece of



modeling clay and tried on the batch of parts in the manner of a fixed gauge. The process is repeated for checking the lower end of the tolerance band, with the micrometer set for the lower size

2. This is useful on lathes whose dials are shaped too awkwardly to permit the fixing of adjustable metal indicators. The markers are particularly useful when screw-cutting

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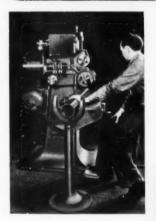
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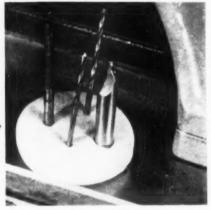
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with the top slide swung around to half the included angle of the thread when the cross slide is always brought back to a repeat setting before another cut is taken along the screw.

3. When it is desired to use a number of small drills and taps in the lathe tailstock, there is always the danger that such small tools will roll off the machine bed into the



swarf in the lathe tray and become lost. A good method of keeping a group of small cutting tools together in safety is shown.

4. When a lathe is not fitted with a graduated tailstock barrel, drilling holes to accurate depth in work held in the chuck tends to be a doubtful achievement. A simple depth control device for use on the tailstock barrel is illustrated. A small piece of thin metal is bent to form an L-shape and this is stuck to the barrel by means of

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ELECTRIC MANUFACTURING CORP. COOLEY SELECTRIC MANORAL SELEC a lump of clay. When drilling the hole, the drill point is in contact with the face of the work, then the depth gauge is stuck onto the barrel with the upward projecting leg of the L-shaped piece of metal in con-



tact with the front face of the tailstock barrel housing. Drilling is started by traversing the tailstock barrel towards the work. A rule held in contact with the piece of metal will travel along with the barrel and the depth of hole drilled can be measured by observing the rule reading in line with the front face of the tailstock barrel housing.

5. The three-wire method of ascertaining the effective diameter of a precision thread is one of the most accurate but is difficult to apply because holding the three wires is very awkward. Modeling clay offers a perfect means for holding the wires in a



manner suitable for presentation to the thread. Here, the wires are stuck at one end into a lump of clay and the micrometer is clamped down upon them as they lie in the thread grooves. It is usual to support the clay with the fingers of

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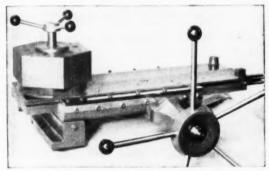
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one hand while measuring the thread. This feature has been omitted in the interests of clear presentation.

6. Truing up work in the four-jaw chuck is usually performed by placing the scribing point of a surface gauge in contact with the work piece as it is revolved. The high spot on the work makes contact with the scribing point and can be pushed



down by tightening the appropriate chuck

The standard surface gauge sits very awkwardly upon the slides of a lathe

since it is not designed for this purpose. Also, to give plenty of space for the surface gauge, the lathe saddle and tool must be traversed out of the way. A simpler way of truing up work is to stick a short scribing point to the actual cutting tool. This is an overhead view. A common domestic pin is useful in the same way for truing up marked circles on work held in the four-jaw chuck.

Carbides will do the job

Carbide-tipped tools will do the job, but definite principles must be considered in application to achieve best results. Volumes of literature on carbide application, especially the "do's" and "don'ts," have been and are being distributed by manufacturers of carbides, yet factors peculiar to grades of metal and certain machining conditions will arise that can be dealt with only by those in direct contact with the job itself. There are too many such factors, and variations of those factors, to be included in any printed form.

Recently the writer was called in on

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give you facts on: how design affects heat treatment, hardenability tests, time required to heat different tools to required hardening and drawing temperatures, furnace atmospheres, quenching, tempering, trouble-shooting.

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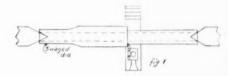
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a carbide turning job that had given trouble over a period of two years. The operation was on a No. 3 Warner & Swasey hand screw machine. We were turning normalized 4130 steel tubing from a .750 dia. to a .570-.572 dia. Length of turn was fourteen inches. The part was held between centers and we were using Carboloy AR 10 Grade 883, which, contrary to recommendations, was holding up better than the recommended Grade 78B. This was error No. 1, as shown in figure 1.

Error No. 2. The tube was spring-



ing away from the cutting edge of tool from .001 to .004, about three inches



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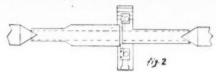


2135 KISHWAUKEE ST. ROCKFORD, ILLINOIS from start of cut. As a result, the cutting edge of the harder Grade 78B was breaking down faster than the tougher Grade 883. However, Grade 883 was not as wear-resistant as 78B, and therefore the r.p.m. and feed had to be reduced.

We corrected the setup (figure 2) and thus eliminated the possibility of vibration or spring by equalizing the depth of cut. Using Grade 78B at 920 r.p.m. feed at .005, we should have realized fair results, but the tools produced only three pieces before the cutting edge breakdown occurred.

Error No. 3. A Rockwell test showed a reading of 18. Work material was soft, stringy, and the shavings dragged and clung to the cutting edge of the tool, causing an excessive heat build-

The parts were heat treated to a hardness of 32 Rockwell. At 1480 r.p.m., .005 feed, we produced sixty pieces before the tools had to be reground. The shavings flowed away from the



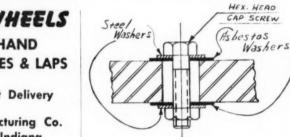
cutting edge, and the finish was excellent.

Carbides will do the job, but trouble analysis must be made to get the best results.

Asbestos washers aid in decreasing hole diameters

By Roger Isetts

The diameter of a hole in a piece of steel can be decreased a few thousandths without resorting to an expensive plating job by the illustrated method. Two asbestos washers are placed against each side of the hole. A hex head screw about 1/3 the di-



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AIR-WAY PUMP & EQUIPMENT CO. 1054 N. Kilbourn Ave. Chicago 51, Ill. ameter of the hole and two steel washers clamp the asbestos against the hole. Heating the piece and quenching it quickly several times in succession will cause the metal to expand, but since the inside surface of the hole is kept relatively cool by the protection of the asbestos, the metal around the hole has a tendency to close in slightly.

Demonstration session at Wahlund laboratory

The M. Paul Wahlund Mechanical Laboratory at Grant, Iowa, was host recently to eleven sales representatives of the Interstate Machinery & Supply Co., Omaha, Neb., of which George C. Edgerly, Jr., is sales manager.

The men came over from Omaha for an all-day educational demonstration of tooling and equipment for various types of machines. Mr. M. Paul Wahlund planned and conducted the factory tour.

Steel City Testing relocates plant

Relocation of Steel City Testing Machines, Inc., in a new and more extensive plant at 8817 Lyndon Ave., Detroit 21, Mich., has been reported by Louis Welt, president of the firm. The transfer to the larger plant was necessitated by inadequate facilities for handling the increasing volume of business.



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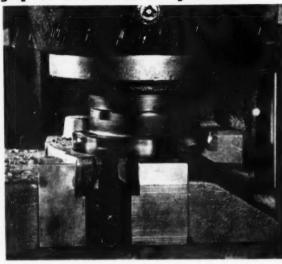
Air vise delivers grip of 200 times air pressure

The Airlox Model S-200 pneumatic vise manufactured by Production Devices, Inc., Whitehall, N.Y., has been developed for workholding on milling machines having up to 50 h.p. The vise delivers a grip on the work of 200 times air line pressure, or 10 tons of jaw squeeze from a 100 lb. air line. A patented air-operated wedge with levers mechanism makes these gripping pressures possible.

The application shown is a fairly light one for this vise. It is being performed at Watervliet Arsenal, Watervliet, N.Y. It is mounted on a No. 4 vertical milling machine.

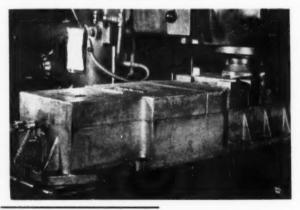
The work piece being machined is a gun part, made of case carburizing alloy steel, .25 carbon maximum.

Feed and speed data are as follows:



cutting speed, 300 s.f.m.; feed 21/8" min.; depth of cut, .155"; length of cut, 33/4"; operation time, 3 min.; cutter, 6" dia. carbide shell end mill.

The work piece being machined on this Airlox Model S-200, built by Production Devices, Inc., Whitehall, N. Y., is a gun part made of case carburizing alloy steel, .25 carbon maximum. The vise is capable of a grip of 200 times air line pressure.



A use for broken drills

By Federico Strasser

For an excellent screwdriver, grind one end of the drill to a point, the other to a screwdriver or chisel point, and bury the pointed end in a file handle or something similar. Grinding serrations



as indicated will keep the shaft from turning.

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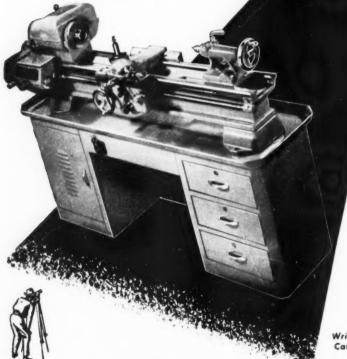
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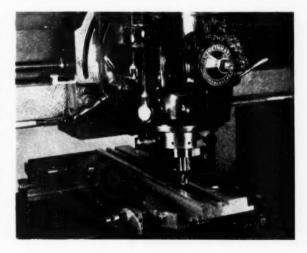
Special High Speed Vertical Miller

THE CINCINNATI Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio, has announced an 18" x 48" high speed vertical milling machine they have developed specially for the aircraft industry.

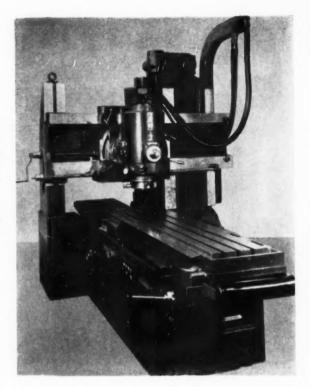
The spindle of this machine is driven by a self-contained, high-frequency, multi-speed induction motor, the rotor of which is integral with the spindle. As such it is independent of mechanical drives from other power sources of the machine and hence would be applied to a wide variety of milling machines.

The spindle carrier is mounted on a sliding carriage on a heavy cross rail support. Cross positioning of the spindle is accomplished by means of a hand crank equipped with micrometer dial for accurate positioning. The spindle

This illustrates slotting cuts on a No. 75 ST aluminum part. Two grooves were milled in the piece 1" wide x 3/4" deep x 42" long, using a 1" dia. 2-tooth high-speed steel spiral end mill running at 10,700 r.p.m. with 25" per minute table feed. Finish cuts were made on the sides of the rib removing 1/32" stock using 10,700 r.p.m. and 150" per minute feed rate. The rib thickness checked within .0004" of being parallel along 41" length of piece.



Front view of 18" x 48" high-speed vertical production type milling machine developed especially for the aircraft industry by The Cincinnati Milling Machine Co. For 4" dia, and smaller cutters the machine is capable of up to at least 10,700 r.p.m. at 50 h.p.



housing is mounted on the carriage in a swivel plate which permits the spindle to be positioned angularly up to 45 degrees either side of vertical. A lever

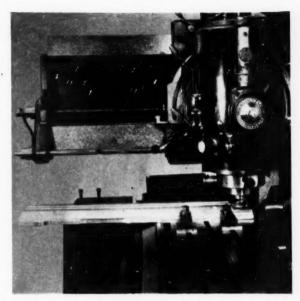
operated latch provides for accurate location of the spindle in the vertical position.

The spindle itself is carried in an



A North American fitting made of No. 75 ST aluminum extrusion. The two angle legs of piece were filled with plaster of paris to reduce vibration of the piece and each angle leg was milled by setting the spindle to the proper angle and milling the leg using a 1" dia. 4" long high-speed steel spiral end mill. Two roughing cuts were taken removing 1/16" and 1/32" stock using 10,700 r.p.m. and 100" per minute feed rate. An additional finish cut was taken removing .010" stock using the same spindle speed and 50" per minute feed rate. A light film of oil was brushed on the piece before taking the finish cut, producing approx. a 100 micro inch finish.

Here is how a cross cut can be taken on an aircraft part since the outer rail support can be removed from the machine to eliminate interference with the work. Various cuts were taken using the same 4" dia. 4-tooth shell end mill as described for the Douglas spar cap operation. Stock removed was 1/4", 1/8" and 1/16"all at 100" per minute feed rate. Spindle speed was 10,700 r.p.m.



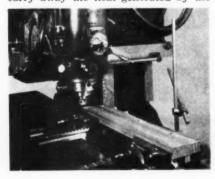
adjustable quill to provide for vertical adjustments of cutter position independent of the vertical adjustments of the cross rail. A three-position turret stop and dial indicator simplifies accurate adjustment of cutter to preselected depths.

A hand lever operated brake and a spindle lock are provided on the spindle to simplify cutter changes. Lever type clamps are provided on carriage, swivel mount, and quill adjustment to lock the spindle rigidly in position during the cut. The spindle housing is connected to a water circulating system to carry away the heat generated by the

extremely high spindle speeds and the spindle bearings are lubricated by a compressed air-oil mist system.

Specifications include: table size, 18" wide; table travel, 48"; table feeds, 0" to 375/min.; table rapid traverse, 400"/min.; spindle speeds and horsepower, 1800 r.p.m. at 10 h.p.—3600 r.p.m. at 20 h.p.—5400 r.p.m. at 30 h.p.—7200 r.p.m. at 40 h.p.; for 4" dia. and smaller cutters up to at least 10,700 r.p.m. at 50 h.p.; vertical range, 2" minimum to 22" maximum; cross range with spindle vertical, 34"; cross range with spindle swiveled, 18"; hand swivel for spindle, plus or minus 45° (vertical axis).

This setup shows a section of a Douglas spar cap of No. 75 ST aluminum approx. 42" long with various cuts taken using a 4" dia. shell end mill having 4 blades, tipped with No. 883 tungsten carbide. Blades set 30° positive axial rake, 10° positive radial rake. Depth of cuts taken for roughing ¼", ½" and 1/16"—all with 100" per minute feed rate and 10,700 r.p.m. of spindle, producing approx. 100 micro inch finish. A finish cut removed .010" to .015" stock using the same feed and speed to produce a flat surface within .0005" for length of piece with finish of 8 to 10 micro inch.

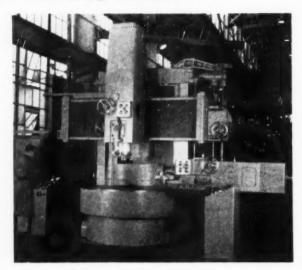


Bullard Vertical Chucking Grinder

THE BULLARD CO., Dept. BB, Bridgeport, Conn., announces the introduction of a vertical chucking grinding machine, in six sizes—30", 36", 42", 54", 64", and 74"—for grinding the larger sizes of work. The first machine is now on production at the Timken Roller Bearing Co., Canton. Ohio.

The combined use of mechanical, hydraulic and electrical components is claimed to provide accuracy, flexibil-ity, power and ease of operation.

A variable speed drive provides infinitely variable table speeds, from



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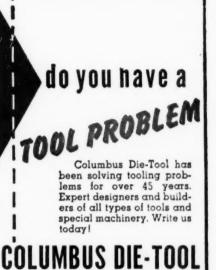
237 Richmond St. . Brooklyn 8, New York creeping to top speed. Reversing controls permit the grinding spindles to be run in either direction. Grinding spindle speeds can be furnished to meet customer's requirements, with maximum motor h.p. rating for the main head grinding spindles of 10 h.p. and for side head grinding spindles, 5 h.p. The grinding heads are equipped with a hydraulic



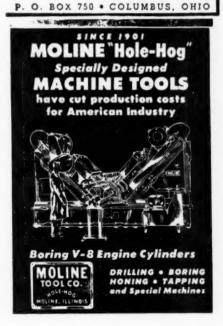
drive for extremely smooth reciprocating action. The rate of reciprocation is controlled by a selector dial having 12 set orifice-type valves for metering the flow of oil. This control permits the operator to select any one of 12 reciprocating speeds, as determined by the customer's requirements. Grinding conditions are selected by turning the dial to a numbered orifice position.

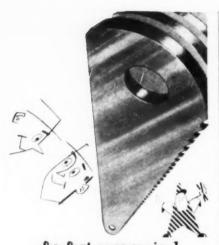
A fine feed and an adjustable dwell are provided for grinding up to shoulders in combination with any of the 12 available reciprocating speeds. This fine feed and dwell can be used together or independently, and can be set for the bottom, top or both ends of the stroke. Readily adjustable cams control the length of stroke, and positive stops assure accuracy. The main head can be swiveled 30° to the right or left of center, and the side head swivels 20° above or below the horizontal position.

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For over 70 years, industry has preferred STAR quality, preferred the blades made of carefully heat-treated, top-quality steel, fabricated on specially designed equipment—all for the sole purpose of delivering fast, economical metal cutting and long blade life.

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STAR Blades are sold only through recognized distributors. You get fast service from local distributors' inventories. You get economical service because your distributor knows your operations best, he is easy to reach, he is trained by qualified factory representatives to know the answers to your metal cutting—and hundreds of other—problems.



CLEMSON BROS., Inc.

Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines is operable at any time. Wheel dressers, hydraulically operated, with adjustable reciprocating speeds are mounted on each head.

For rigidity and accuracy, the grinding wheels are mounted on the motor armature shaft. The grinding spindle housing incorporates the motor field. Hardened and ground square lock ways for both heads are concealed and protected within the head housing. (The cylindrical grinding wheel housing or motor frame does not constitute a reciprocating bearing member.) Grinding spindles can be readily removed from the square lock slide within the head, permitting a spare to be quickly installed.

Newman wheel dressers in 5 models

Wheel dressers made by L. Newman, Dept. BB, 1001-5 24th St., Oakland 7, Calif., now come in five different models. Model No. 1, illustrated, is the surface grinder model. The cylindrical grinder model is No. 2 with

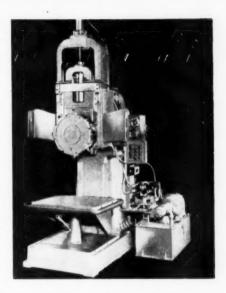


a vertical stand and slot for bolting down. Model No. 3, designed to be bolted down on a cylindrical grinder, is universal and can be used on a surface grinder in any desired position. with or without magnetic chuck. Model No. 4 is a hand-type dresser for use on bench or pedestal grinder, but it is also applicable for abrasive belts or for dressing knife sharpener grinding wheels.

Large capacity drilling and tapping machine

Burg Tool Co., 3743 Durango Avenue, Dept. BB, Los Angeles, Calif., announces its newest addition, the Burgmaster Model 3-BH 8-spindle, automatic, hydraulic drilling and tapping machine. It was designed to meet the demand for a larger Burgmaster drilling and tapping machine, the manufacturer claims.

The following are said to be leading features: rigidity of castings; husky rigid spindles; precision, heavy-duty bearing; extreme accuracy in relation between spindles, head travel, and table travel; simple setup; adequate power; simple electric and hydraulic controls; large throat clearance and table area; long spindle travel; economy of floor space; minimum maintenance; 8 spindles; 14" drill capacity in mild steel; 12" spindle and head travel; 19" table travel; 171/2" throat clearance; table work surface—36" wide by 35" deep, with "T" slots; 10 h.p., 2-speed motor, U. S.; Timken bearings on



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BURNERD CHUCKS PRECISION BUILT MADE IN ENGLAND







SELF CENTERING GEARED SCROLL

Nickel Chrome Steel Pinions & Scroll, Semi-Steel Body, Uni-versal Three Jaw, Two Sets of Jaws, Three Pinion

Model	Size	Wt. Ibs.	Price
28	23/4"	21/2	\$ 25.00
29	31/4"	31/2	26.50
30	4"	61/2	30.00
30A	5"	113/4	37.50
31	6"	171/4	45.00
30BP*	4"	81/4	33.50
30ABP*	5"	15	42.50
31BP*	6"	21	50.00
52	71/2"	29	57.50
53	9"	43	67.50
54	101/2"	62	95.00
55	12"	88	125.00

of J	aws,	Two Pi	
Model	Size	Wt. Ibs.	Price
29Y	31/4"	33/4	\$ 30.00
30 Y	4"	7	37.50
30AY	5"	121/2	43.50
31Y	6"	181/4	52.50
52Y	71/2"	29	85.00
53Y	9"	42	95.00
54Y	101/2"	62	110.00
55Y	12"	88	150.00
30AYBP*	5"	153/4	48.50
31YBP*	6"	22	57.50
9	oft J	aws Avai	lable

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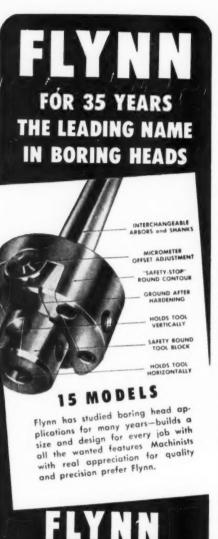
LIGHT INDEPENDENT CHUCKS

Nickel Steel Operating Screws, Semi-Steel Body, Four Jaw Re-versible, Hard Steel Jaws

Model	Size	Wt. Ibs.		Price
35A	31/4"	23/4	3	12.50
35B	4"	4	-	14.00
35C	41/2"	5		18.50
34	6"	10		22.50
35BP*	4"	61/2		18.00
35CBP*	41/2"	7		22.50
34BP*	6"	14		26.50

Models marked with asterisk () are fitted with 1½-8 Back Plate for all popular 9" and 10" lathes.

WITT EQUIPMENT CO. 136 Lafayette St., New York 13, N.Y.



MANUFACTURING CO.

133 Flowerdale

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spindle; 12 preselective spindle speeds from 167 to 1765—4 to each spindle; infinitely variable, preselective spindle feeds; automatic cycling through any or all stations with rapid approach, feed, dwell, slow feed-out, and rapid traverse-out, preselective for each spindle.

The Burgmaster can be used on straight drilling operations or on complicated forming tools for i.d. or o.d. turning, tapping, threading, plunge cut end milling, large counterboring, spotfacing, and any other second operation.

Hall drill point gage

Hall Engineering & Mfg. Co., 3039 Alcott Ave., Dept. BB, Flint, Mich., announces its True Check drill point gage. Advantages claimed are: elimination of scrap from oversized holes; no



size reaming; reduction in down time; more holes per grind; more feed per revolution; longer tool life; less bushing wear; less land wear; more accuracy in any operation.

The drill to be inspected is first placed on the roll guides in furthermost forward position with lips located against the lip plate and lip stop. The latter is adjusted to the approximate center of the drill lip. The two dial indicators are set at zero. The indicator plate will indicate the degree of lip angle.

Now, to show indication of any deviation in the true center of the drill point with relation to the lips, rotate the drill 180° in true horizontal position and in full furthermost forward position with lips located against the lip plate and lip stop. This will be shown on the lower dial indicator. The upper dial shows any deviation of angle of one drill lip as compared to the other. The lower reads in thousandths and the upper in degrees.

First nationwide fork truck rental system announced

What is claimed to be the first national plan making possible rental of industrial trucks was announced recently by the Automatic Transportation Co., Dept. BB, 149 West 87th St., Chicago, III.

The plan will be carried out by the Chicago electric industrial truck manufacturer in conjunction with C. I. T. Corp., the industrial financing subsidiary of C. I. T. Financing Corp.

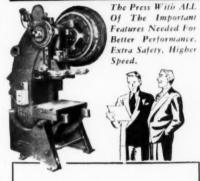
Automatic will negotiate agreements with potential users through its franchise representatives. C. I. T. then will purchase the equipment from Automatic and lease it to users. Rental contracts for all electric industrial trucks will be for nine years. Contracts for associated equipment, such as batteries and battery chargers, will run from five to nine years.

Installment purchases of equipment are also made possible by the new program. The procedure in this instance resembles automobile financing. After an initial down payment, regular monthly payments are arranged, not to exceed a 36-month term.

Desk-aid for carbide users

Adamas Carbide Corp., 100 S. Fourth Ave., Dept. BB, Harrison, N. J., manufacturer of tungsten carbide, has announced the availability of a desk-aid designed for carbide users. It combines a decimal-equivalent chart, a ruler, and a 1953 calendar. This handy desk-aid is backed with adhesive and can easily be attached to a desk top or desk leaf for immediate reference.

LOBINSON



For almost a half century leading industrialists throughout America have depended on Robinson presses for ALL of the important improvements in the punch press field.

Robinson presses are available (in either standard or air clutch models) in a complete capacity range, and all of them are fully described in our latest brochure which also includes detailed specifications. You may request a copy without incurring any obligation.

New Albany Machine Mfg. Co. New Albany, Ind.

Welds non-ferrous metal by pressure

Utica Drop Forge & Tool Corp., Dept. BB, Utica, N. Y., manufacturer of hand tools, in cooperation with the Koldweld Corp., announces a new device for the welding of non-ferrous metals such as aluminum and copper without heat, flame or electrical current and without acids, fluxes or chemicals. In the case of the butt-welding of wires it is as simple as inserting the two wire ends into a small device and squeezing plier-like handles. The job is said to be accomplished in this way in a matter of seconds and no skill is required.

The process, originating in the laboratories of the General Electric Co., Ltd., of England (no connection with G.E. in the U.S.A.), is covered by some 45 patents and applications owned by G.B.C., Ltd. Sole licensee in the U.S.A. is the Koldweld Corp. Arrangements have been made between Utica Drop Forge & Tool Corp. and Koldweld for the former to supply equipment for Koldwelding to manufacturers and others in the U.S. and abroad.

Due to the critical shortage of copper and the resulting interest in aluminum by the electrical, aviation, automotive and other industries, the Koldweld process has great significance. In the butt-welding of strands of aluminum wire, for example, the weld is made in a matter of seconds. There is an actual inter-molecular flow which accomplishes a small, compact bond said to have a greater tensile strength than the wire itself.

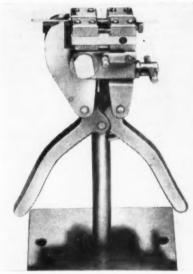
Unlike conventional welding, in which heat anneals the metal and reduces its tensile strength, Koldwelding actually work-hardens the metal. Wire can be drawn after the weld is made and tensile strength tests show that it will ultimately part at some point remote from the weld before the weld itself will fail.

The Koldweld is such that after removal of the small flash of metal at the bond, the connection is the same gage as the wire itself. Since no exterior material or metal is used in making this connection, electrolysis is eliminated. A number of cable companies in England are in the process of

adopting this method of connection for cables.

In electrical wiring of buildings the Koldweld process is said to substantially reduce fire hazard because the joint becomes integral with the wire itself.

In addition to use for the buttwelding of wire, the Koldweld process can also be used in joining flat sheets of non-ferrous metals. The bond is made solely by pressure, as in the case of the butt-welding of wire. The bond



is said to be so strong that, under test, the metal itself will tear out before the weld fails.

Utica Drop Forge & Tool Corporation states that two devices for accomplishing the Koldweld will soon be in production and available to industry. These are the Utica Koldweld tool for wire and the Utica Koldweld tool for sheet. They are compact, easily portable, weigh but a few pounds and operate basically on the pliers principle. Plans are now in hand to make a small pocket tool no longer than a standard pair of pliers for the electrical contractor and the home owner.

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A new time-saving tool post for any number of "Rough" thru "Finish" form operations . . . eliminates costly set-ups. Quickly interchangeable by simply sliding out one tool holder and slipping in another to the exact original pre-set position. Tool bits can be resharpened right in the holder without changing the set-up. Can be easily adjusted to any height without using shims . . . assures rigid set-up . . . ideal for toolroom and production . . . FITS ALL LATHES.



Prices include tool post and five tool holders

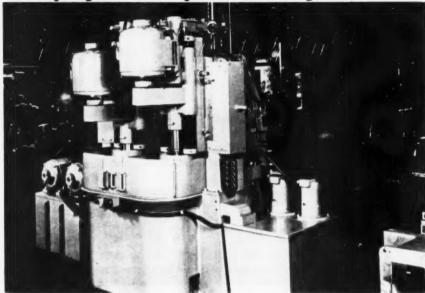
 Model B
 Max. Tool Bit ½"
 Max. Boring Bar 1"
 \$ 98.00

 Model C
 Max. Tool Bit ½"
 Max. Boring Bar 1¼"
 196.00

 Model D
 Max. Tool Bit 1"
 Max. Boring Bar 1½"
 275.00

ALORIS TOOL Co., Inc.

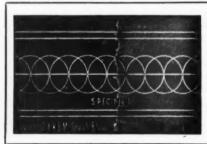
80-82 FOURTH AVENUE NEW YORK 3, N. Y. GRamercy 7-7858 New Springfield dual spindle vertical grinder



Designed for operator convenience with greatly increased production, the new Springfield dual spindle vertical grinder has individual controls which are not interlocked, and self-centering centrifugal chucks. These features permit an easy, natural, rhythmic operation almost continuous in nature without undue attention or fatigue, claims the manufacturer, the Springfield Machine Tool Co., Dept. BB, Springfield, Ohio.

On production work the left-hand

spindle may be in operation while the right-hand spindle head is retracted for unloading and loading. Work is set in the chuck of the nonoperating unit and, as the table begins to revolve, the centrifugal force causes the jaws to grip the work firmly throughout the grinding cycle. When the table stops at the end of the cycle the jaws automatically open with the cessation of the centrifugal force, and the operator lifts out the finished piece to replace it with unfinished work for the grinding operation. Completion of the cycle on the



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

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 FEATURE FOR RAPID SET-UP.
- CUTTING CAPACITIES FROM 1/32" TO 2" DIAM-ETER IN STANDARD STOCK, IMMEDIATE DELIVERY.

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Medelton Motor "Poweroll"

\$270.00 F. O. B. N. Y.

FEATURES .

- · Eliminates hazards of lifting heavy rolls.
- · Roll on your cail and it's ready to go.
- · Stack loop prevents drag on feed or dies.
- 30% to 40% higher daily production on hand or automatic feeds.
- · Re-loading time kept to a minimum.
- No pulling of coils, avoids operator's fatigue, and results in faster feeding.

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COMPRESSION SPRING ASSORTMENT Music wire. Many sizes and diameters. 10" lengths. Select size. Cut to length desired. Much quicker than winding springs by hand. Low Prices.



TRIGGER STOPS

For progressive dies. Made of cold finished steel—soft, Black penetrate finish. Finger end forged flat. 4 lengths— $3\frac{1}{2}$ " to 5"— $\frac{1}{6}$ " dia.



QUARTER TURN SCREWS

Black penetrate finish - soft. For jig and fixture work. Accurately machined and nicely finished. Five

T-NUTS



Cyanide hardened. Used with Set-up Stud Sets. 15 sizes.



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Gentlemen:

Please send us FREE copy of 44 pg. catalog, illustrating and describing the REID line of necessary and hard-to-get components and accessories.

Name

left-hand spindle a short time later permits unloading and loading of this unit while the right-hand spindle is still in operation. The illustration shows the left-hand unit operating while the head of the right-hand unit is retracted for loading.

A typical automatic cycle which is identical for the two production units is: rapid traverse until wheel contacts work; grinding feed then starts automatically and when completed, with final sizing and fine finish, a quick return of the wheel head to starting posi-

control buttons and switches are conveniently located at the front of the machine and are duplicated for each of the two units. The "mushroom" buttons seen in the illustration are for emergency stopping, and the thumb buttons beside them for full cycle starting. Panels at the operator's position have switches which set the cycle for either automatic or manual control of the entire unit and include work table operation, coolant flow, head setting, compensation for wheel wear, cycle reset, hydraulic unit, grinding head and diamond dresser actuation.

Van Norman cylindrical grinder for production grinding of small parts

The Van Norman Co., Dept. BB, Springfield, Mass., announces the new



418 grinder, especially developed for fast precision traverse or plunge cylindrical grinding of small parts on a production basis.

The 418 grinder is claimed to be



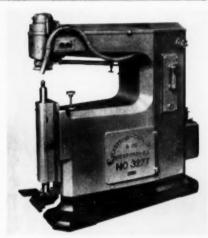
particularly adaptable for economical grinding of small parts in the toolroom and job shops where work usually is in small or medium runs.

The recessed design of the base permits the operator to sit comfortably at the machine. All controls are conveniently grouped within easy reach from the operating position. Workpieces are loaded, ground and unloaded with minimum motion and effort.

Ekstrom-Carlson No. 327-T trim router

Designed especially for the aircraft industry, the new No. 327-T trim router by Ekstrom, Carlson & Co., Dept. M-3, 1400 Railroad Ave., Rockford, Ill., is suited for trim routing large and difficult-to-handle nonferrous sections. Either of two spindle speeds, 10,000 and 20,000 r.p.m., is easily obtained with a selector lever and a simple belt change, and 3, 5, or 7½ h.p. spindle drive motor at 3600 r.p.m. is optional.

Physical dimensions of this machine



include a 27¾" throat clearance and a floor to guide pin holder height of 32¾". The adjustable distance from the end of the guide pin holder to the face of the spindle ranges from a 3" minimum to a maximum 9¼". Spring-

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at the extremely low first cost and the vitally important lobs that this little precision machine can de. It will pay out a get our accuracy information on fhis machine which has 6"x10" table movement and 7"x 17½" table size.

Write TODAY For Full Information

COMPANY 663 State St. Ext. Bridgeport 1, Cenn. loaded, sliding guide pin holder provides a 6¼" maximum stroke, controlled by means of an adjustable, screw-type stop.

High density metal

The Metal Carbides Corp., 107 E. Indianola Ave., Dept. BB, Youngstown 7, Ohio, is marketing what is said to be a new noncutting metal of extremely high density. Comprised chiefly of tungsten, it has a specific gravity in excess of 17.5 GMS/CC, which is about 50% greater than lead. This new metal is being used very successfully to resist the penetration of radioactive rays and its use for atomic radiation screening is increasing rapidly. It is readily machined with carbide-tipped tools. It can be produced in sizes up to 25" O.D. x 40" long and in weights in excess of 1,000 lbs.

The tungsten alloy is finding wide application as a metal suitable for static and dynamic balancing, as well as other applications requiring maximum weight in minimum space, such as balance weights on crankshafts, gyroscopes, propellers and centrifugal clutches.



For Export: States Trading Co., 401 Broadway, New York, N.Y. Cable Address: Stradesc. N. Y.



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BORING HEADS

A full line of adjustable boring heads and bars now available. Heads 11/2" to 7" dia, Carbide or high speed bars 34" to 134" dia. Lead screws ground AFTER HARDENING, Ample begring surface, heat treated parts, interchangeable shanks. Criterion tools are the criterion. Write for free catalog and costs.

9312 SANTA MONICA BLVD. . BEVERLY HILLS, CALIF.

Beverly THROATLESS SHEAR Out any Shape... straight or

Make any cut - curved. straight or irregular, faster, easier and better with less material waste on a Beverly Throatless Shear, You can turn work to any position

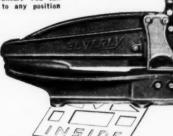
and make a clean cut as you go. Handles heavy gauges with ease-lighter metals without distortion. 4 models - capacities 18 gauge to 3/16" mild. All Shears equipped with H.C. H.C. Blades for cutting Stainless.

INSIDE SLOTTER

8" Reach - 16 gg. cap.

Makes inside slotting cutting faster, easier, cleaner. Punch and die arrangement of 5 blades assures accuracy, clean euting action. Cuts $2\frac{1}{2}$ "x $\frac{1}{6}$ " slot at one stroke. Throat slot at one stroke, fired at any point in stroke for special inside cuts. Note sample cuts at left,

See your Beverly Dealer or write for illustrated catalog.



BEVERLY SHEAR MFG. CO., 3005 W. 111th ST., Chicago 43, III.

B-3 with

Ball Bearing Hold Down

Norton Cylindrical Grinding Machines

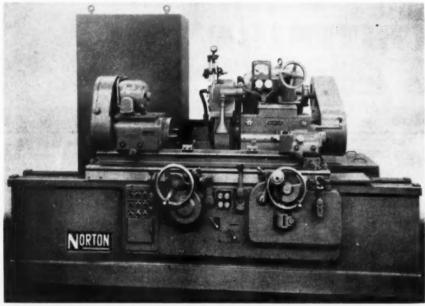
These new heavy - duty machines, made in 18", 36", 48", or 72" work lengths, rapidly and accurately perform plunge-cut and traverse grinding operations that require larger diameter or wider grinding wheels than are accommodated by the conventional type CTU cylindrical grinders. They are made by Norton Co., Dept. BB., Worcester 6, Mass.

The most important feature of the 10" Type CTU-HD and 14" Type

made instantly and without visual attention.

Setup and operation are simplified by accessible placement on the front of the machine of all adjustments for feeds and speeds.

To simplify maintenance functions, all pumps and motors are mounted on the outside of the machine. Filters, relief valves, ways lubricant flow control valves and the ways lubricant reservoir are also accessibly positioned outside. Electrical controls are grouped in an



LCTU-HD machines is the heavy wheel head with super-duty size pressure-lubricated wheel spindle for wheels up to 10" wide. The extremely high service capacity of this head, combined with rigid work-supporting units and smoothly-operating sliding components, is said to assure fast grinding action with enduring precision. Wheel feed is by an outstandingly precise "revolving feed screw" type mechanism having a "click-count" index by which settings for .0001" work diameter reduction are

elevated enclosure for protection against infiltration of foreign matter and for convenient inspection. A ramped outlet on the coolant tank greatly eases tank cleanout, and a hinged wheel guard cover provides accessibility for wheel changes. The base ways are protected by efficient space-saving steel tape-type guards.

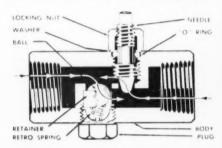
The semiautomatic machine is designed for highest output on plungecut jobs. Its automatic grinding cycle operates under one-lever control, which simplifies operating effort to the extent that it may be possible for the operator to attend more than one machine.

The plain machine provides all the above features with the exception of the automatic grinding cycle for plunge cuts, and is said to be especially good for traverse grinding jobs.

Pneu-trol flow control valve

Pneu-Trol Devices Inc., 3122 N. California Ave., Dept. BB, Chicago 18, Ill., has recently introduced an improved flow control valve, equally efficient for air or hydraulic use.

The valve provides full flow in one direction and a wide range of adjustments in the opposite, or controlled, direction. The new valve incorporates



a floating "retro-ball" check and a unique improved gland structure of the needle.

The gland structure combines the "O" ring sealing principle with an adjust-ment-locking feature in a compact design. A light helical spring does not load the ball but locates it in the most sensitive floating position to the seat, regardless of the position in which the valve is mounted.

The manufacturer claims to have increased its sensitivity, made possible higher operating pressures and improved operation of the new valve, permitting its use in many control applications heretofore considered impracticable.

Pneu-Trol flow control valves are made in 5 pipe sizes, 1/8" to 3/4", and are made from solid hexagon bars of brass, aluminum, steel and stainless steel. All other parts are stainless. Male end fitting tube adapters are available



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PRECISION FEEDS FOR ALL TYPES OF PRESSES





New you can be sure of nonslip, accurately measured feeding (in theusandths) on your punch presses, either bench or pedestal types. Instantly reversed by merely shifting feed finger spring from one lug to the other! Original satting is maintained as there are no ratchets or pawls to wear. Plan to equip your presses with Relil Feeds. Write today for complete list and date.

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in the same material as valves. Operating pressure up 5000 lbs. p.s.i.

Oil and corrosion-resistant parts are used throughout. A single, lightly stressed stainless steel return spring is used, and this, plus internal friction, is all the operator has to overcome. In the palm button model, which is operated by a straight push, this effort is only 5-½ pounds.

Proto torque-limiting wrench

Design of a Proto precision torquelimiting wrench without the usual external indicating devices has been announced by the Plomb Tool Co., Los Angeles, Calif. It is suited for nut and bolt torquing by almost all types of industries and by all mechanics.

The new Proto torque wrench differs from most conventional types in four



basic respects. First, it is a torquelimiting device (releases automatically at proper setting), and not a torqueindicating device.

Second, it employs a fully enclosed precision spring under compression as the principal torque-controlling element. Third, it uses an accurate micrometer-type adjustment. Fourth, models with a built-in reversible ratchet head are available that do the

work of both a ratchet and torque wrench.

Desired torque is set up by turning the handle, just like a micrometer. When the right torque is reached by pulling the handle, the wrench releases automatically and signals the operator with a positive reflex action. Upon removal of hand pressure, the torquer resets automatically for the next operation.

According to the manufacturer, the new design is accurate, versatile, easy to use, rugged, and much faster than types with indicating devices.

Six models are currently available—three with ratchet head and three with plain head. Capacities are 5-75 or 10-150 ft.-lbs. Drive sizes are 3/8" or 1/2".

JLE air and hydraulic cylinders

A complete line of air and low-pressure hydraulic cylinders has been announced by the James L. Entwistle Co., Dept. BB, Providence, R. I. Bore sizes range from 1½" to 14" inclusive, and standard length of stroke may be obtained up to 84".

These cylinders are reported to be of the heavy-duty type and feature square heads machined from solid steel. Dirt wiper seals and high-tensile strength stainless steel piston rods are said to eliminate costly repairs or maintenance. The barrels are made from non corrosive hard-drawn seamless brass.

The piston cups employ oil-resistant composition material, with a hard non-compressible center and flexible edge. The piston assembly is said to be held absolutely square with the cylinder walls. A self-regulating gland packing forms a leakproof seal ahead of a bronze piston rod bearing.

Standard mounting brackets include leg or foot mountings, front or rear flanges, clevis mounts, pivot ends. JLE cylinders are available cushioned at rod end, at rear end or both. The cushion retainers are built flush into the heads so as not to protrude, which enables the user to orient the ports at 90° to each other for piping in different planes. The square head design is said to facilitate close center mounting in multiple installations. Double rod end cylinders are also featured in this line.

The merican

LINE OF COLD PIPE, CONDUIT AND HEAVY WALL TUBE BENDERS HAND AND POWER

ONE OF 10 HAND-OPERATED TYPES



MOTOR-POWERED TYPE E AND F



5 and 7½
h.p. —
Bend up
to 90°
without a
mandrel.
MotorOperated
capacities
2½" to 6"
inclusive.



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For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. (3½' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

AMERICAN PIPE BENDING MACHINE CO., INC. 9 Furnace Street, Poultney, Vermont

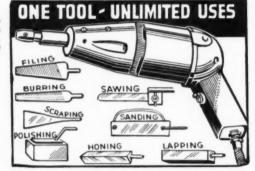
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PORTABLE • ELECTRIC RECIPROCATING TOOLS

These handy tools will cut out many tedious hand filing and finishing operations.— Increase Production—Produce Uniform Work.

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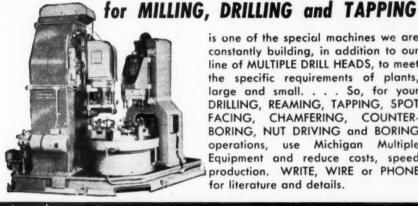
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NEW YORK 7, N. Y.



Chandler Duplex

This 4-Way SPECIAL MACHINE



is one of the special machines we are constantly building, in addition to our line of MULTIPLE DRILL HEADS, to meet the specific requirements of plants, large and small. . . . So, for your DRILLING, REAMING, TAPPING, SPOT FACING, CHAMFERING, COUNTER-BORING, NUT DRIVING and BORING operations, use Michigan Multiple Equipment and reduce costs, speed production. WRITE, WIRE or PHONE for literature and details.

ICHIGAN DRILL HEAD CO.

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TURNTABLES AND POSITIONERS. Eisler makes over 100 different types for welding, brazing, soldering, spraying, glass insulator melting and glass glazing, with rotating stations and indexing with barrel cam or geneva gear action. For work transferring, tilting positions, motorized or hand operated. Rotating tables of all kinds for over 33 years. We supply any part or complete equipment and we make special turntables to your order.









SPOT WELDERS











EISLER ENGINEERING CO., INC.

762 SO. 13TH STREET, NEWARK, N. J.

T-J Spacemaker air cylinders

A new line of T-J "Spacemaker" air cylinders, whose design eliminates tie rods and reduces head size, is announced by the Tomkins-Johnson Co., Dept. BB, Jackson, Mich. This results in a savings in mounting space, which



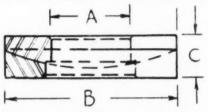
provides additional room for adjacent equipment without sacrificing strength. it is said.

These air cylinders have solid steel heads and heavy wall seamless steel body. Cylinder walls are precision honed and hard chrome plated. Design

of the Spacemaker also features leakproof cylinder head to body construc-

Two-piece spherical washers

A new line of two-piece spherical washers for use in the construction of jigs and fixtures is being offered by Reid Tool Supply Co., 709 Baker St., Dept. BB, Muskegon Heights, Mich. They are made of low carbon steel,



precision machined and case hardened. All sharp edges are removed and they are zinc plated for appearance and rust prevention. Eight sizes are available for use with bolts ranging from 1/4" to 1" diameter.



Reasons for You to get the Facts on SPEEDGRIP CHUCKS

- 1. They increase production.
- 2. They give greater accuracy.
- 3. Set-up time is shorter.
- 4. They are safer to operate.
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Speedgrip Precision Internal Chucks will save you money on second

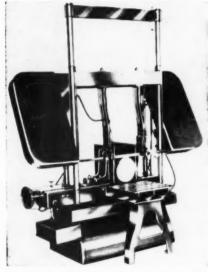
operation work.



Saw has 24" x 24" capacity for large or small cutting jobs

A new saw announced by W. F. Wells & Sons, Dept. BB, North on 131, Three Rivers, Mich., has an extra large capacity, 24"x24", although it is suitable for both large and small cutting jobs, the manufacturer claims.

A special arrangement of the cutting head, employing two wheels, rather



than a single large one on each side, holds over-all size of the unit to just a trifle more than smaller capacity saws, it is said.

The Model J-24 also features full and semiautomatic operation (cutting head raises and lowers hydraulically). There is all-welded, rather than bolted, construction.

The four band wheels give it larger capacity per length and floor space required, and the employment of a truss gives extra rigidity to the columns. It is also completely hydraulic.

Powered-air jig vise

Suprecision Products, Dept. BB, 2447 Nicollet Ave., Minneapolis 4, Minn., are announcing their B-3 powered-air jig vise that is said to give accurate and consistent clamping for repetitive



Used and endorsed by tool and die, electronic, machine, plastics, radio, electrical and instrument manufacturers. A real money saver.

Specify the Green Engraver for precision engraving on metal, plastics, wood, glass, hard rubber etc. . . . engraves panels, name plates, scales, dials, molds, lenses, instruments, instruction plates, directional signs . . by simple tracing from master. Routing, profiling and three dimensional modeling indicate its versatility. Electric etching attachment available.



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Prismatic Ways Tool Head Power Down Feed Automatic Lubrication

SPECIFICATIONS:

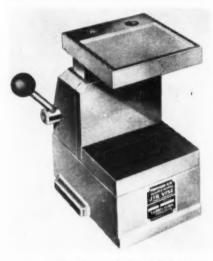
Ram Stroke 28"—Ram Strokes per minute 9 to 108—No. of speeds 6—Feeds: Table, horizontal 31½", vertical 15½", Tool Head 7"—Feed range .010 to .060"—Motor HP 5

MI5AL

1 EAST 53rd ST., NEW YORK 22, N. Y.

Also available: Ariston 540 (21" stroke) Ariston 640 (24" stroke) Ariston 870 (34" stroke) machining operations such as drilling, tapping, reaming and assembly.

Features include: increased production through speedier handling; easy setting and removal of work from the vise because of open front; simple flick sets jig-vise in motion—the vise can be clamped permanently into position for constant production-line work, or



temporarily clamped for job-lot production; weight permits easy positioning; air control valve is an integral part of the vise; any set of plates can be removed and replaced without loss of original accuracy; vise clamping pressure is 10 times air line pressure, the latter controllable; double-acting air cylinder exerts equal pressure and speed in either direction; actuated from either right or left side, or integrated with a machine for mechanical operation.

Blue M industrial type batch ovens

Blue M Electric Co., 306-308 W. 69th St., Dept. BB, Chicago 21, Ill., announces that it has engineered and developed a series of fully automatic, extra-heavy-duty, new industrial-type batch ovens for faster production. These industrial ovens feature automatic

wattage control and balanced heat with temperature range of 100°F to 600°F. This automatic wattage control permits the reduction of wattage in relation to temperature and load. Another feature is the diagonal forced air flow which permits heated air to be circulated from both sides, hori-



zontally and vertically. Positive fresh air intake and positive exhaust are standard equipment.

Application for procedures include coil and armature baking, aging, drying, preheating, synthetic finish baking, preheating plastics, curing of coated plating racks, core baking, tempering and silicone baking.

Integrated inspection unit

An integrated inspection unit, said to incorporate all devices normally required for close dimensional checking of precision machined parts, has been patented and announced by Swanson Tool & Machine Products, Inc., Dept. BB, Erie, Pa., makers of V-Liner concentricity gages and special precision machines.

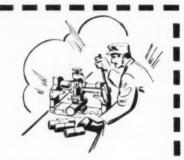
The basic unit includes five fundamental checking tools—surface plate, bench centers, V-blocks, sine plate and indicator attachment—plus an exclusive concentricity attachment which per-



- A.S.A. standard and special drill jig bushings,
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.
 Write for bulletin and price list.



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MODELS
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mits rapid checking of relative diameters and bores in round or square parts of variable outside diameters. This is accomplished by a vertically adjustable V-block, positioned by a calibrated, direct-reading adjusting screw to compensate for diametrical differences up to 4½" in shafts as large as 7¼" diameter. No involved computation is needed. The opposed V-block is hori-



zentally adjustable to accommodate parts up to 50" in length.

All devices are automatically aligned and are easily attached, adjusted or removed from the 60" surface plate by means of a knurled hand screw. The surface plate itself is available in 12" or 24" width, ground to within .001" or scraped to within .00025".

The bench centers will accommodate shafts up to 48" in length and 8" in diameter. The V-blocks have a 74" diametrical capacity. The sine plate is hardened and ground tool steel 5" by 234". Optional accessories are also available for special-purpose inspection.

Modernair develops new air hydraulic cylinder

Modernair Corp., 400 Preda St., Dept. BB, San Leandro, Calif., announces its latest development in the field of industrial pressure-operated devices, an air hydraulic cylinder. Two bore sizes are presently available as standard—2 and 3 inch—other sizes on special order.

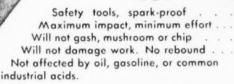
This cylinder features interchangeable mounting brackets, a feature of the other Modernair air and hydraulic cylinders, for complete versatility of mounting. Standard shop airline pressure is utilized to actuate the cylinder, NUPLA HAMMERS

mighty yet gentle

Outlast and Outperform
All Other Soft-faced
Hammers Many Times Over



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"13 Weights, 5 Sizes, 4 Tip Hardnesses — A Tool For Every Job"
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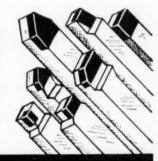


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STADOIL Diamond Lapping Oil removes load and glaze. It enables you to get on the diamond cutting edges down to the last diamonds. And since no pressure is needed to sharpen, all scratching of tools is eliminated. Diamond wheel manufacturers are unanimous in recommending STADOIL for carbide tool grinding. Excellent as a thinner for diamond lapping compounds to speed lapping. In use for 18 years . . . specified by 6900 plants.

STADOIL is sold in half-pint to 50-gallon containers. If your industrial distributor can't supply, order direct.

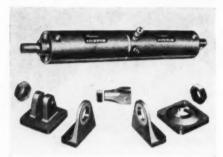
For full details, write Dept. 3



STADOIL MANUFACTURING CO. EL MONTE, CALIF., U.S.A.

while the built-in hydraulic system furnishes positive regulation of forward or reverse stroke movement by adjustment of speed control.

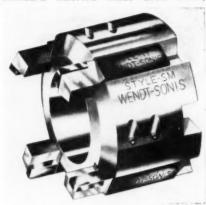
This cylinder is said to be ideal for powering tools or work in machining



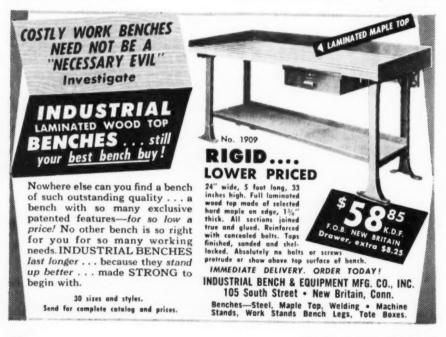
operations, to permit rapid traverse (if skip feed by-pass is used), finely controlled movement during work operation and fast reverse action. Flush exterior permits installation in restricted space. The hydraulic control insures smooth action.

Wendt-Sonis inserted blade shell mills

Smoother finishes and more precise tolerances are claimed for the new standard inserted blade shell mills.



manufactured by Wendt-Sonis Co., Dept. BB, Hannibal, Mo. According to Wendt-Sonis engineers, these carbidetipped shell mills will cut production



time and reduce tool cost on nearly

every application.

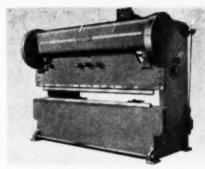
All blade slots of these cutters are finished-ground to precision tolerances to assure minimum tooling time and maximum operation time. Blades are also ground on both locating sides, assuring minimum of total indicator runout when tool is in operation.

All carbide cutting edges are diamond lapped. Blades can easily be removed for free hand grinding to a template or precision ground in the cutter body. Two styles of blades are available for steel, nonferrous and cast iron milling. Wendt-Sonis shell mill sizes range from 3" to 6" and are available in 4- and 6-blade styles.

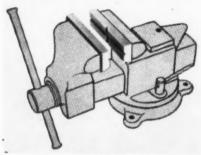
Permanent magnets in vise soft jaws

A new type of soft jaws for vises is being introduced by Magne-Grip Tool Co., Dept. BB, 4900 W. Madison, Chicago 44, Ill.

By utilizing built-in permanent magnets, Magne-Grip soft jaws are snapped which includes a 50 ton series, a 100 ton series and a 150 ton series is announced by Niagara Machine and Tool



Works, Dept. BB, Buffalo 11, N. Y. Bending, curling, jogging, corrugating, notching and punching are only a few of the many operations these versatile machines can perform, the manufacturer claims.



into position quickly and easily. They hold securely and can be removed by simply lifting them off.

A two-way V-groove locks the work in, holding it in any position desired, regardless of size or shape. Magne-Grip soft jaws are made of an alloy that won't mar, scratch or gouge delicate finishes or highly polished metals. They will not "wear out" or lose their holding power in years of use, it is claimed, and they can be easily refaced if required.

New Niagara press brakes

A new line of all-steel press brakes

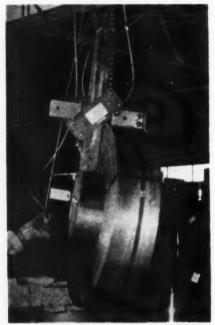


For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Avu. - Detroit 7, Mich.

New coil grab models introduced

Dixon Automatic Tool, Inc., Dept. BB, 2300 23rd Ave., Rockford, Ill., recently introduced two coil grab models, each with 5,000 lb. capacity. One grab is designed for normal width coils up to 12" wide and the second for coils up to 24" wide. As with the lighter weight coil grab models, one operator can lift the coil from the pallet up to a vertical position in one easy motion. It is also



designed for picking up coils from a vertical position and laying them down on a pallet.

A safety lock is incorporated in the design to maintain a positive grip on the coil at all times. It is easy for one floor man to handle both the hoist and grab, according to the manufacturer.

A prong, tapered to fit between the coils in the space made by the coil bands, is positioned while the opposite jaw is placed in the center of the coil. As the crane lifts, the grab automatically adjusts to the coil size. As the coil

lifts, the grab turns to allow the coil to move to a vertical position.

The Dixon coil grabs are available in 2,000 and 5,000 lb. sizes. Larger sizes are available on special order.

Portable, superficial metal hardness tester

A new Ernst tester from Newage International, Inc., Dept. BB, 235 E. 42nd St., New York 17, N. Y., is said to permit metal-producing and metal-working plants to obtain superficial readings with a portable instrument. It makes possible on-the-job metal hardness testing and tests without damaging the material or part. It gives direct dial reading in Rockwell "15N" Scale, 70-95.

By placing the tester on the material to be tested, and pressing downward on the handgrips, a direct reading is obtained on a large, easily read dial.

The tester has a spring-loaded diamond penetrator indentor. Readings



appear on a 2-inch-diameter scale. The movement of the indentor as it penetrates the material slightly compresses the diaphragm of a fluid-filled chamber. Fluid is thereby forced farther into the capillary tube, which encircles the dial, to indicate the hardness number on the dial scale. The movement of the indentor into the material is magnified about 3,000 times by the fluid displacement in the capillary tube. The final position of the fluid indicates the hardness value directly on the scale.

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MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER SPEEDS PRODUCTION Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

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MOSLO "SHIFTWEIGHT" COUNTER-BALANCED WIRE REELS

Takes the Manual Labor out of loading a Reel with Wire. Just unlock the knurled spindle by a twist of the wrist, tilt the reel assembly 90°, roll coil of wire to reel, lift 6" on to centering arms, release lock by twist of wrist, use spindle as lever to lift, and the Weighted Counterbalance does the rest!

Capacity 300 lbs. — Min. Coil I.D. 10" — Max. O.D. — 41" All welded steel construction — Brake Equipped.

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2443 PROSPECT AVENUE

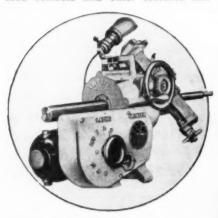


Immediate Delivery \$190.00 F.O.B. Cleveland CLEVELAND 15, OHIO

Barrett Model B-23 portable lathe

Time and cost-saving adaptations are claimed to have been developed in metal working plants for an ingeniously designed, precision-built portable lathe manufactured by the Barrett Equipment Co., Dept. BB, 2101 Cass Ave., St. Louis. Used by automotive service shops, car, truck, bus and trailer manufacturers and dealers, Barrett is now making this portable lathe available to industry.

The portable lathe, identified as Model B-23, is a completely self-contained unit, semiautomatic in operation after the initial setup is made. Ten speeds, from 0 to 45 r.p.m., are r he os t at-controlled by a convenient dial. Infinite feed controls and other features can



be adjusted while the lathe is in operation.

The lathe head travels as it revolves on a boring bar arbor. The tool arm, adjustable for diameters from 7½" to 20", remains fixed in relation to the head. The speeds and feeds of the machine are limited only by the material of the workpiece and the cutter, which may be either high-speed steel or carbide.

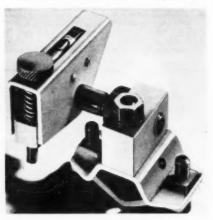
Design of the lathe permits either the external or internal machining of a circular workpiece, up to 20" in di-

ameter, by simply reversing the tool holder and installing the current type of cutting tool.

Another type of small lathe made by Barrett also has found wide adaptability in fields other than automotive. Identified as Model B-500, this machine has a revolving arbor on which the workpiece is mounted, while the cutting tool remains stationary. Fully automatic in operation, the B-500 has three cutting speeds, two feeds, coarse and fine, and many features for convenient, easy operation.

Pekay Depthmaster for bore depth control to 1/1000"

With a stop on machine tools such as turret lathes, hand screw machines, drilling machines, etc., one may work to 1/1000" tolerance in one operation,



it is claimed, by using the new control device recently announced by Pekay Steel Fabricators, 865 Sangamon St., Dept. BB, Chicago 22, Ill.

The control, called the Pekay Depthmaster, can be attached to the hand wheel of any machine in minutes. By recording the exact amount of pressure against the stop at all times, it gives the operator control of his work. Functioning on a gravity principle, the unit han moving parts or parts under strain.

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ALL TYPES OF HOLDING FIXTURES FOR MACHINE SHOP PRODUCTION CLEVELAND Production Tool Co.



Small special fixture for clamping two shafts. Operation straddle milling ends.

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SWARTZ TOOL PRODUCTS CO., INC.

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NEW IMPROVED HAND SCRAPERS

with just the correct spring

and other features never before incorporated in any hand scraper





This new Hand Scraper, Model No. 5, is the most improved tool of its kind ever produced. Light in weight, easier to use with palm fitting comfort grip, faster cutting.

Rubber handle swivel pad, at small

extra cost, for those who place scraper handle against body for extra leverage. Three sizes: 18"-20"-22" long. Furnished with high speed steel or Carboloy Blades. Cost less than home made scrapers.



Write for Bulletin No. 5-3

ANDERSON BROS. MFG. CO., Rockford, III.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.

Custom engineered material handling trays

Custom engineered material handling trays, fabricated from sheet rubberbase thermoplastic, are now being produced by Jered Eng. & Mfg. Co., 19818 W. Eight Mile Rd., Detroit 35, Michigan.

Trays are now being fabricated to handle quantities ranging from a single piece to 300 units or more. Supports and dividers can be formed integral with the tray, a voiding costly and perishable elements. Because excellent supports can be built in, many trays are also used as assembly fixtures.

A variety of colors facilitates tray identification in production and inventory control.

"U.S. Royalite" or "Boltaron" are used in the fabrication of these trays. Trays



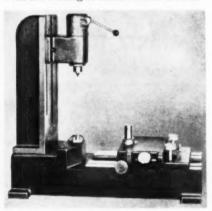
are light in weight, stainproof, grease-proof, mildew-proof, vermin-proof, and shatterproof. Inasmuch as the material consists of forty percent (40%) rubber, the items are given toughness, long-wearing properties and inherent resistance to corrosion and attack by most industrial solutions and compounds. Trays loaded with precision parts can be dropped without damage, due to the shock absorbing properties of the material. In addition, the trays are attractive and easy to clean.

Jered Eng., & Mfg. Co. provides com-

plete engineering and fabricating facilities for producing other items from this material, such as carrying cases; dust covers; machine guards; automobile, aircraft and appliance parts.

Bench-type external gear rolling fixture checks size, eccentricity and smoothness

Model 602 bench type rolling fixture for checking size, eccentricity and roll smoothness of spur and helical external gears is announced by Michigan Tool Co., 7171 East McNichols Road, Dept. BB, Detroit 12, Mich. The fixture features a heavy cast iron base, scraped ways and hardened and ground ball ways. It can be used in conjunction with the Michigan Model MTR-50 auto-



matic recorder to place all readings on permanent charts.

The gear to be checked is loaded on a vertical arbor that is moved into mesh with the master gear by an eccentric lever control. Proper tension between gear and master gear is maintainel by spring-loaded ball ways. Turning the gear manually causes a 0.005-in. indicator to show size, eccentricity and smoothness variations.

The Model 602 rolling fixture has a center distance adjustable from 2 to 10 inches. The master gear arbor is 1-in. o.d. Arbors for gears to be checked are made to suit. The fixture is 9½-in. wide, 29-in. long and 7¼-in. high.

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From the smallest to the largest requirements on stamps, roller dies, typeholders, or machines, we are equipped to deliver promptly, quality marking equipment.

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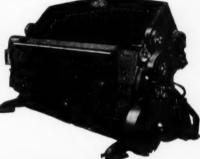
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Special Bending Brakes

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STRAIGHT EDGES AND SURFACE PLATES HAND SCRAPED FOR ACCURACY

It's here . . . A Willison designed dovetall straight edge to reach the dovetail ways on machine tools. Lighter in weight—less upkeep required—neutralizes the effect of temperature changes.

ONLY DOVETAIL of this DESIGN
Vertical ribs and built in suspension pads,
combined with a fine close grain cast iron.
Double normalized and accurately hand scraped.
Take the guess work out of machine alignment and let it go to work for you.



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MODEL No. 4

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The nameplate on your product is your signature; keeps it neat and legible! Accurate location and alignment are assured

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- Simple Operation
- Perfect Alignment
- Uniform Depth

GEO. T. SCHMIDT, INC.



) 1804 W. BELLE PLAINE AVE. CHICAGO - 13 - ILLINOIS

New Design in Wales Punching Units

A new design feature that is said to provide a positive die retainer and a simplified interchangeable die removal method on Wales Type "CJ" hole punching units has just been announced by the Wales-Strippit Corp., 396 Payne Ave., Dept. BB, North Tonawanda, N. Y.

This new development permits the interchangeable dies to slip-fit in the holders and to be

fastened into position by a threaded pilot pin. The threaded pilot pin is tightened or removed with a hex wrench.

Each Wales "CJ" hole punching unit consists of a holder that carries the punch, die and stripping mechanism. This patented, independent, selfcontained design eliminates the neces-









sity of attaching punch to press ram and assures permanent alignment of punch and die.

Setups are made on T-slotted plates or templates for stamping presses and on T-slotted plates, rails or strip templates in press brakes.

By simply placing the setup on the press bed it is ready to start punch-

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ELECTRIC MANUFACTURING CORP. 36 50. SHELBY . INDIANAPOLIS, IND.

ing with the first stroke of the press without adjusting the units, punches or dies. Due to the uniform shut height of Wales Type "CJ" hole punching units, the press ram requires only one adjustment, regardless of the number of hole punching patterns placed in operation. These features reduce press "downtime" between setups to a matter of a few minutes.

Wales Type "CJ" hole punching units are available in three holder widths with maximum punch diameter of 3/4" for use with metal up to 1/4" thick. Pedestal - type die permits punching holes in angles as well as sheets.

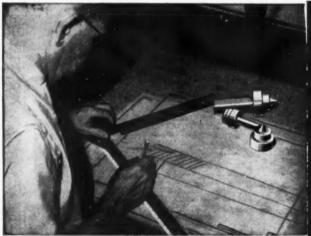
Dake announces new line of gap type hydraulic presses

A complete line of hydraulic gap type presses for forcing and straightening operations is announced by the Dake Engine Co., 608 7th. St., Dept. BB, Grand Haven, Mich. These presses are available in eleven standard forcing models and eleven standard straightening models—22 in all—with capacities rang-



ing from 15 to 300 tons. They are electrically powered.

The straightening presses have a self-



Engineered Live Centers of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.



contained power unit, and adjustable stroke control for both direction of stroke. A combined hand and foot lever provides sensitivity which permits the operator to apply any pressure up to maximum by merely increasing pressure on the control valve.

The forcing presses have a two-speed ram advance and extra large table, permitting their use for a wide variety of operations. The stroke can be preset for both directions by an adjustable stroke limit cam. Semi-automatic or automatic cycling can be provided.

Continental stub drill chuck

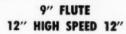
The Continental Tool Works, a division of Ex-Cell-O Corp., 1200 Oakman Blvd., Dept. BB, Detroit 32, Mich., announces a new stub drill chuck for use in multiple-spindle heads. Supported in rigid, true-running spindles, these chucks project a minimum distance and use short drills so that bushings and bushing plates are not required. This setup increases drill life substantially over the conventional setup in which drill chucks and drills



project considerably beyond their supporting bearings, making it necessary to use guide bushings to locate the holes.

A U-shaped drive key engages notches

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	Size	Price Each
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	11/64" x 12"	2.06
	3/16" x 12"	2.06
	13/64" x 12"	2.19
	7/32" x 12"	2.19
7	15/64" x 12"	2.40
/	1/4" x 12"	2.40
1 23 1	17/64" x 12"	2.55
# / T	9/32" x 12"	2.55
	19/64" x 12"	2.75
	5/16" x 12"	2.75
	21/64" x 12"	3.11
46	11/32" x 12"	3.11
超7	23/64" x 12"	3.46
4 /	3/8" x 12"	3.46
	25/64" x 12"	3.81
	13/32" x 12"	3.81
	27/64" x 12"	4.17
	7/16" x 12"	4.17
静 。	29/64" x 12"	4.52
	15/32" x 12"	4.52
8 /	13/64" x 12"	4.52
VAII .	1/2" x 12"	4.52
- 6		

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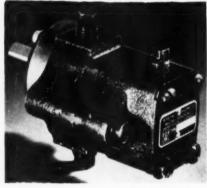
207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

in the shank of the drill and fits a groove in the faces of the collet and holder. This provides a positive drive and also prevents the drill from being pushed back into the collet under feeding pressure. The drills, which may be purchased from any manufacturer at approximately the same cost as standard drills, have several sets of notches in the straight shank to provide length adjustment.

Webster electric LAM series pumps

The oil hydraulics division of the Webster Electric Co., 19 Clark St., Dept. BB, Racine, Wis., announces the addition of the LAM series to its line of hydraulic pumps. These new gear type pumps are designed for use in fuel oil systems for oil transfer or filtering. With the addition of a pressure regu-



lating valve they can be used as a supply pump for high capacity oil burners.

The LAM series pumps will handle No. 2, 3 or 4 fuel oil, or preheated No. 5 fuel oil. They are available in five sizes, with capacities ranging from 10 to 65 g.p.h. at 1800 r.p.m. and 100 p.s.i.

An internal relief valve is available which can be set between 50 and 200 p.s.i. by a simple manual adjustment. This valve cannot, however, be used as a control or pressure-regulating valve.

The pumps are also available as 115/230-volt motor-pump combination units.



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Versa valves

The % and ¼ NPT-size line of pneumatic and hydraulic valves manufactured by the Versa Products Co., Inc., 249 Scholes Street, Dept. BB, Brooklyn, N. Y., includes two-, three-, and fourway types with a choice of hand, foot, pilot, or cam actuating devices, each with or without spring return. The same four actuating devices fit all three valve types in either size and can be used either singly or in combination of two to provide for any actuating requirement. In addition, all internal



parts are interchangeable. All Versa valves can be completely serviced or disassembled without disturbing pipe connections and with only a screwdriver. These factors make practical rapid alteration, in the field, from one valve type or means of actuation to another.

Among features is the "anti-extrusion" arrangement of all the kinetic "O" ring seals in each valve type. These valves also feature threaded exhaust ports and all ports are plainly marked to facilitate installation. The transverse flow area in all types and sizes corresponds to the pipe size of the valve. The small actuating force required is relatively unaffected by the line pressure since all types incorporate balanced pressure spool design.

Eze-Tru diamond wheel truing

Super-Cut Inc., Dept. BB, 3418 N. Knox Ave., Chicago 41, Ill., announces a new patented diamond wheel truing method to mount and line up cup-type diamond wheels used on machines that



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when used with spindle

when used with spindle attachment. Stroke is adjustable from 0" to ¼". Attaches to standard flexible shaft drive. Yours or ours. High pre-cision provides reciprocating action without vibration.

ation.
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have back plates. This quick method of truing wheels is said to save time by entirely eliminating the necessity for shimming up low spots when back plates of machines are out of align-

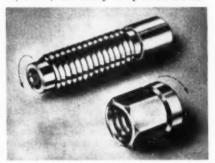
The new Eze-Tru feature has auxiliary, tapped openings in wheels which are fitted with small screws. By selectively tensioning these screws against back plate of machine, the diamondcutting surface can be quickly and accurately brought into a true plane at right angle to the rotation of the



spindle. This feature can be supplied on 6", 7" and 10" dia. shallow or plain cup-type wheels.

Swivel shoe set provides positive holding

This new swivel-shoe set recently developed by Allied Air Parts, Dept. BB, 662 N. Robertson Blvd., Los Angeles 46, Calif., has many important ad-



vantages over methods now used for holding tools and parts, the manufacturer claims.

The new sets are adaptable to any type of tool, jig or fixture. They provide positive holding without marring, scratching or burring the held part. Their use eliminates the high cost of making shoes on the job and also the time-consuming job of mounting plates and fixture shoes so that home-made shoes can be properly mounted and riveted.

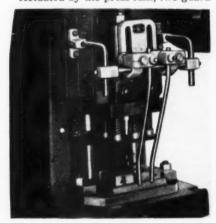
All parts of the Allied swivel-shoe set are carefully machined to insure concentricity of shoe and pitch diameter of screw. They can be used on drill jigs, mill fixtures, profile fixtures, shop tools, screw turrets, etc.

Two types are available: hexagon swivel (H-S Series), adaptable to any type and length screw, and swivel set (S-S Series), a socket-head screw with swivel shoe attached for use in tight quarters where movement is restricted. Both types are available in various sizes.

Cooper Weymouth sweep guard

A safety guard for forming and secondary operations on power presses up to four-inch stroke, has been introduced by Cooper Weymouth, Inc., Dept. BB, 277 Noble Ave., Bridgeport 8, Conn.

Actuated by the press ram, two guard



arms with a sweeping motion push the operator's hands safely away from the danger area as the ram starts to descend. So natural is this motion that protection is positive, increasing the confidence of the operator and allowing



over LOAD

Look for the RED BAND

You no longer have to guess whether you are overloading your live center threst bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

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Also available with 15° cutter channel for H.S.S. tool bits.

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The operator's field of vision is unobstructed by the two guard arms, which may be arranged in a variety of ways to suit specific applications. They can be formed so as to sweep directly over the lower die or to guard the front, the back or the side of the die, or a combination of these positions to assure safety operation.

Features of this press guard are simplicity, ease of installation, needle bearings to insure long life, rugged construction throughout and positive safety

for the operator.

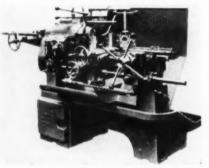
Ward No. 2C turret lathe

The Ward No. 2C ram type turret lathe is now being offered by British Industries Corp., Dept. BB, 164 Duane St., New York 13, N. Y. Ward is one of England's largest manufacturers of turret lathes.

The 2C lathe is designed for heavyduty high-speed production of components from bars up to 1½" diameter, or from castings, forgings or billets up to 7" diameter. The spindle is of the



MUrray Hill 4-0466-7-8



flanged nose type, and is rigidly supported in combined radial and axial thrust precision ball bearings and heavy-duty roller bearings, and all rotating parts in the headstock are mounted in suitable ball or roller bearings. Automatic pump lubrication is supplied to all bearings and gears. Twelve spindle speeds are available ranging from 48 r.p.m. to 2041 r.p.m.

An outstanding feature is the builtin, automatic, cam-operated spindle brake. From any speed the spindle is stopped instantaneously by simply moving either clutch lever to its central position. This feature greatly facilitates the chucking of hexagonal or square parts for second operation work.

Longitudinal power feeds are available to both the turret slide and the cross slide saddle. The turret slide has six rates of feed ranging from .0025" to .0167" per revolution. The 1" diameter holes in the hexagon turret enable the use of standard American screw machine and turret lathe tools. Special toolholders with overhead pilot bushings are supplied with the machines for use in conjunction with the overhead pilot bar to assure sustained accuracy in turning and boring operations.

Jet engine compressor case machine developed in Germany

A machine, specially built for the complete machining of a jet engine compressor case, has been developed by Alfing Kessler Werke of Germany and is available in the United States through Morey Machinery Company, Inc., Dept. BB, 410 Broome Street, New York 13, N. Y.

The design is in two pieces. The boring bar is of rigid design with a temporary support during loading. The



tool slides are mechanically actuated and hydraulically controlled.

Both halves of the housing are clamped in the fixture by a series of self-locking, spring-loaded blocks. The carriage then advances the work over the boring bar. The boring bar is inserted in an outboard support-bearing and the temporary support is retracted. Cylindrical, tapered or combined bores, end faces, T-slots and other grooves can be machined. Boring bar design permits considerable adjustment for design changes.



Hammont Machinery Builders
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Makes stampings by progressive die method

A MACHINE recently put into service in the automotive industry may broaden the use of high-speed automatic presses, according to the manufacturer, Henry & Wright, division of Emhart Mfg. Co., Dept. BB, Windsor St., Hartford, Conn.

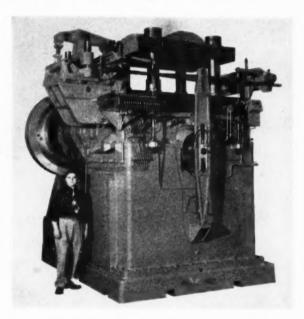
Handling metal up to 25" wide and 11/32" thick, the new high-speed automatic dieing machine makes completely drawn and formed stampings in 13

Material used is .065" thick hot rolled steel in coil form.

Up to 16" strokes can be provided for producing straight shells up to 3%" long and tapered or hemispherical shells of greater lengths. Only one operator is required.

Precision alignment of the tools is provided by the unique construction

This machine recently put into service in the automotive industry may broaden the use of high-speed automatic presses. In first application, where it replaces zinc casting methods used previously, it makes completely drawn and formed stampings in 13 operations by the progressive die method. The 350-ton machine is one of the largest of its type ever built. Developed by Henry & Wright, Division of Emhart Mfg. Co., Hartford, Conn., it handles metal up to 25" wide and 11/32" thick.



operations by the progressive die method. The 350-ton machine is one of the largest of its type ever built.

In one of its first applications the automatic unit was put to making right- and left-hand parts for an automotive window control gear at the rate of 60 complete pairs per minute. Steps performed with each stroke of the machine—including notch, pierce for pilots, draw, bend ears, and 9 other operations—replace the zinc casting method used previously to produce the part.

employed. In the dieing machine any angular thrust from the crankshaft and connection is absorbed by the lower crosshead instead of the punch-carrying member as is the case in conventional overhead crankshaft presses.

Maximum guidance control is given to the machine's crosshead by use of long ways which are rigidly keyed in the lower base. In this way, precise alignment of tools is provided throughout the stroke, even under severely eccentric loading.

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SPEEDS Production
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MODEL 1236 36-in. throat. 12-gauge capacity.

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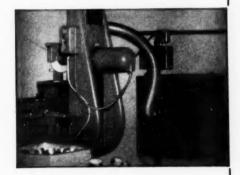
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Ask for Catalog 605-2. Describe dust problems for recommendation by return mail — no obligation.



AGET-DETROIT CO.

502 Main St. Ann Arbor, Michigan

New type optical inspector

Announced by Safe Flight Instrument Corp., Dept. BB, White Plains, N. Y., is the G-12 Goniometer Collimator, a new optical tool that, when attached to machine tools or used for inspection purposes, measures angles to great precision, and yet is simple enough for ordinary shop operations. Collet and lathe tool angles, for instance, are said to be easily checked, and bedway flatness can be measured to within 0.00007 in. It eliminates the use of sine bar setup techniques, requires no calibration, is completely self-checking and eliminates jigs and fixtures. Because it is self-aligning, it need only be clamped to any convenient support, without requiring mounting on a special bed or surface. It measures continuously and, unlike fixed gages, can incorporate engineering changes without requiring gage work.

In addition to the standard type of angular and flatness measurements, the manufacturer says the Safe Flight G-12 Collimator can also perform many



tasks normally impossible by other measuring means.







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Swing over table Distance between centers 20" Surface of table 5" x 32" 4 spindle speeds, r.p.m. 2900 to 5800

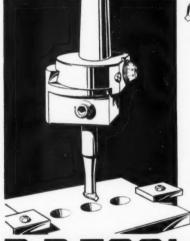
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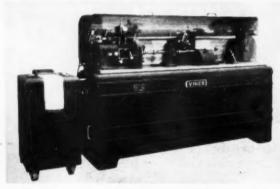
Inspects contour and timing of engine camshafts

Vinco Corp., 9111
Schaefer Highway, Dept.
BB, Detroit 28, Mich.,
announces a new camshaft comparator. Engine
camshafts are checked
against a master cam to
determine the variances
in the cam contour of
the part.

The master cam is said to be ground and lapped to an accuracy of .0001". Cam contour variances are shown on a .0001" dial indicator and simultaneously recorded on a linear chart.

The dial indicator readings and chart recordings are identical and will repeat within .0001".

Cam lobe and keyway timing errors are shown on an inbuilt, Vernier equipped, graduated plate and the timing check is accurate to within one minute of arc. Although the instrument



is tooled for an individual camshaft, a wide range of sizes can be accommodated. Work capacity is as follows: between centers, up to 44"; journal diameters, up to 2%"; cam base circles, up to 1%"; cam rise, 0" to %".

Camshafts that are similar in all respects, except cam contour, may be

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- Shortens dressing time.
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A "Barker" will economically handle a complete range of milling, drilling, key-seating, and mill-ing, slotting and simple lathe operations.

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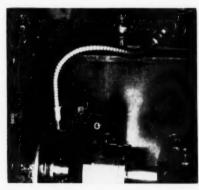
COOLANTS. AIR. CUTTING OILS AND LUBRICANTS





Write for Bulletin O.F.L. No. 1

JOHNSON METAL HOSE, INC. 100 SPERRY ST. WATERBURY 20, CONN.



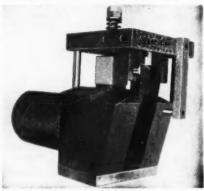
inspected by making minor changeovers. This may require up to ¾ of an hour of setup time. A major tooling change-over is necessary if an entirely different camshaft is to be inspected. This would require up to 1½ hours of setup time. Full inspection of a camshaft (cam contours, cam relationship, and timing) requires approximately 30 minutes. Highly trained technicians are not needed.

Micro Pin toolsetter

A new device known as the Micro Pin toolsetter has been developed to reduce, from hours to a comparatively few minutes, the time necessary to replace one or more tool bits. It is being made by Arnold C. Gayne Associates, Inc., 670 State St., Dept. BB, Bridgeport, Conn.

The theory of the toolsetter is simple and practical. After a setup is made and a part is produced within tolerance, the toolsetter is placed on the toolholder. The Micro Pin setter is held on the holder by a permanent magnet through spring pressure, eliminating any clamping distortion. Three pointpositioning legs allow for any irregularities in the toolholder.

Gage pins are then brought into con-



tact with the cutting edges of the tool bits. These pins are then locked with setscrews and the toolsetter is removed with the exact tool position locked to



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the pins. The toolsetter is then placed on a surface grinder and the back ends of the pins are ground flush with the face. The setscrews are backed off and

the pins allowed to float.

To reset a tool bit, the toolsetter is placed on the toolholder or boring bar. The tool bits are advanced until the cutting edges contact the floating pins. Adjustment is made until the back ends of the pins are flush with the face plate. This is done by feel on a rough cut or with a dial indicator on a finish cut. The tool bits are secured and the toolsetter removed.

Faster alignment for aircraft jigs, fixtures

A new and faster method of aligning aircraft jigs and fixtures is claimed to have been developed by the United States Testing Co., 1415 Park Ave., Dept. BB, Hoboken, N. J.

The new stand has a cast iron base and is readily adjustable for carefully



controlled change in position of the instrument and in leveling. The stand can be moved about without difficulty,

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and releveling or alteration of the stand base is not necessary. Precise horizontal plane relocation can be made with two positioning screws. The base column screw adjusts the height at will.

One approximation in level and location can be accomplished with the three tripod base screws. From this point on, it may be left in place while various reference lines in the vicinity are used.

The maximum column adjustment is 12 inches. The horizontal plane adjustment is four inches in each direction.

New Sub-Zero freezers for testing

Low temperature testing is said to be practical for any size laboratory or test department with the new XV-70 series industrial chilling machines just announced by Sub-Zero Products Co., 3930 Reading Road, Dept. BB. Cincinnati 29, Ohio. The new unit will hold any temperature from -10 to -70 degrees F. and has a thermal capacity of 500 b.t.u. per hour.

For wide flexibility in application, the XV-70 will be available in chilling chamber sizes ranging from 5 down to 1.5 cubic feet. Since the unit is designed primarily for testing, the largest chilling chamber dimensions will be 30" by 18" by 16" deep.

In view of the chilling chamber capacities, the XV-70 series is unusually compact in over-all size, the manufacturer reports. This is made possible, it is stated, by the use of highly efficient insulation and a hermetically sealed motor compressor.

Of all-steel construction, the Sub-Zero XV-70 has a chilling chamber wall of 3/16" steel to facilitate the handling of heavy or sharp-edged metal parts. The lid is counter-balanced. Special Sub-Zero design eliminates moisture condensation on the outside of the lid and cabinet.

The Sub-Zero XV-70 series is a companion line to the recently announced series XV-120, which is built in the same sizes and capacities but with a temperature range from -70° to -140° F.

MARSHALLTOWN



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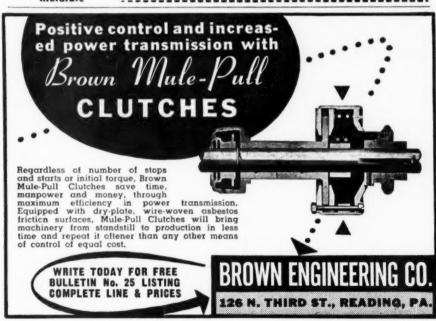
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- 9 models.

MARSHALLTOWN MFG. CO.



Tilting rotary table featuring power rotation accurate to seconds

A new 24" diameter tilting rotary table has been added to the line of rotary tables made by Pratt & Whitney, Division Niles-Bement-Pond Co., Dept. BB, West Hartford 1, Conn. A high degree of accuracy, together with power rotation, is said to make this table very versatile.

Power rotation is provided by a 3-phase ½ h.p. shell-type motor that has been built into the table pivot. Motor design and location are such that mechanical shocks are minimized. The table can be rotated through 360° in either direction, in any plane of arc, by the use of convenient push-



button controls. For fine adjustments the table is rotated by the use of a hand wheel with a self-centering spinner knob. Table graduations in degrees are read directly off the table, while minutes are read on the table rotary wheel dial. A vernier used in conjunction with the rotary wheel dial brings readings down to two-second intervals. A sliding pointer on the side of the table bed can be set at zero anywhere along a 45° arc.

The rotary table can be tilted from 0° through 90°. A rapid elevating hand wheel is provided for fast positioning. Table arc settings are made in degrees, using a graduated quadrant on the face of the table pivot. A vernier on this scale subdivides to one minute. For more accurate positioning of the table arc the sine bar method is used. This method involves setting up a simple triangulation problem and using the

desired angle to solve for the unknown height of the triangle. Precision gage blocks equal to this height are then placed on the ground and lapped platform and the table lowered until the measuring pin on the table bed touches the top of the gage blocks. Accuracy in seconds up to a 45° elevation can be accomplished in this manner.

Angle type air tool drills 3/4" holes at 90°

A series of three new angle type drills, made by the Keller Tool Co., Dept. BB, Grand Haven, Mich., has been announced. They are powered to drill holes in aluminum or brass from 9/16" up to 34" dia., and in mild steel from ½" to 11/16" dia. The new tools will be known as the 11C series.

The 11C tools are said to be especially desirable for close quarter work where



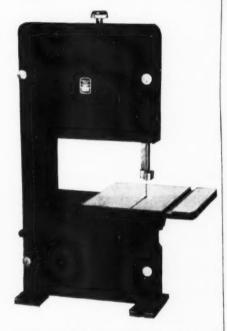
larger size drills are required. They have the speed necessary when drilling light metals, and the power needed to drive large drills. Stalling these tools under heavy load does not injure the air motor in any way. Fifteen variations of speed and chuck size are available to meet any requirement accurately within the stated range.

Parts are interchangeable. Other construction features include bevel gears mounted on ball thrust and roller bearings to assure maximum efficiency in transmitting power to the drill spindle; and neoprene seats on the control valves which provide permanently airtight seals.

Wood or metal saw

The Model 47 band saw was announced recently by Tomlee Tool & Eng. Co., 718 Washington Avenue North, Dept. BB, Minneapolis 1, Minn.

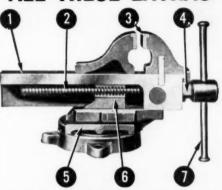
It is said to be engineered to do everything that saws in the higher price field will do, within the limits of its 5%" throat capacity. In larger machine shops, the band saw is intended as an auxiliary unit so that the big saw can be kept in



readiness for big work. A range of speeds will accommodate wood or metal.

A large worktable easily tilts to 45° and is grooved to take a mitre gage for angle or compound cuts. It operates at four speeds and is powered by a ½ h.p. motor, furnished as an extra. Included with the saw are a set of guides, a %" blade, and an instruction bulletin. Accessories available are an all-steel cabinet-stand, mitre gage and a rip fence.

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- 1. All steel slide gives greater capacity; guaranteed not to fail.
- 2. Steel screw, fully enclosed and pro-
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- 4. Easier lubrication due to outside retainer.
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- 6. Minimum backlash; longer, stronger vise nut lasts indefinitely.
- 7. One piece handle, non-pinching type.

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MODEL	WATTS	TEMPERATURE	RANGE	PRICE
5700 SRL 5700 SRM 5700 SRH	1800	30 to 350° F. (26 30 to 400° F. (26 30 to 550° F. (26	to 204° C.)	\$280.00 \$280.00 \$280.00
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20 Hour Timer \$17.50 extra

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Manufacturers of Electric Furnaces and Ovens

Clemson announces new hack saw blade sizes

Clemson Bros., Inc., Dept. BB, Middletown, N. Y., manufacturer of Star hack saw blades, announces a new schedule of blade sizes, to meet new industrial standards recently adopted by the Hack Saw Manufacturers Association of America, Inc.

The new standards reduce over-all

blade inventory requirements, both for users and dealers, since blade duplication virtually is eliminated.

The revised standards have been adopted not only by the United States manufacturers but also by Canadian and British producers, and are expected to be adopted shortly by a number of European nations.

Nev	W	blad	0	sizes	add	opted
by	C	lemso	n	Bros.	for	their
had	k	saw	b	lades.		

residen-rus.	width-ins.	Inickness-ins.	leeth per in.
10	1/2 1/2	.025	18, 24, 32 14, 18, 24, 32
44	1/2	.02)	14, 15, 44,)
		des - High Speed Ste	
Length-Ins.	Width-Ins.	Thickness-Ins.	Teeth per In.
12	5/8	.032	14, 18
12	1	.050	10, 14
14	1	.050	10, 14
14	1-1/4	.062	6, 10
14	1-1/2	.075	4, 6
17	1	.050	10, 14
17	1-1/4	.062	4, 6, 10
18	1-1/4	.062	6, 10
18	1-1/2	.075	4, 6
18	1-3/4	.088	4, 6
21	1-3/4	.088	4, 6
24	1-3/4	.088	4, 6
24	2	.100	4
30	2-1/2	.100	4
36	4-1/2	.125	2

Single-Edge Hand Blades - All Steel Types



Capacity 7/16" hole through 1/4" steel or equal.

65 sizes of round, square, flat, and oval punches and dies are carried in stock to fit this punch.

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Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

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Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order. Send sample parts when writing for quotation.



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Morton flash trimmer with horizontal traverse

This new rolling mill flash trimmer, made by Morton Mfg. Co., Dept. BB, Muskegon Heights, Mich., is designed for use in a continuous-process rolling or pickling line. Coils of steel are joined together by electric welding to form a continuous strip which can be passed at constant rate through the pickling and washing processes for scale removal. It is then recoiled into multiple length coils for reducing material loss and cost in cold-finishing processes. The Morton flash trimmer is placed in the line adjacent to the flash welder. The welded sheet is quickly moved to the



approximate center of the trimmer, which is provided with hydraulic horizontal traverse 6" each way from center for final alignment of the machine with the weld.

Hydraulic clamping pressure is used for clamping the sheet during the trimming cycle. An upper and lower ram, each containing five adjustable toolholders and cutting tools operate in hardened ways in the upper and lower housings. They travel in a path parallel to, and a fixed distance from, the clamping dies. The rams move across the sheet by chain drives which receive their inand-out motion from a reversible direct-connected motor.

The operator stops the weld near the center of the machine, then hydraulically traverses the machine to final alignment. A push-button controls the lowering of the upper housing and clamping of the sheet. The rams move automatically and simultaneously across the sheet removing the flash. At the end of the fixed travel, limit switches unclamp and raise the upper housing, the rams return to the front

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A simple and rugged machine for tapping holes and cutting threads accurately and speedily by hand. With holding fixtures screwed to the work plate, castings, stampings, moldings and machined pieces can be threaded on a production basis. Bods, tubes, wires and studs quickly threaded by using chuck adapter and die. Easy to operate. Occupies 16°x18" bench space. Write for circular now!

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Division of Thomson Industries, Inc.

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STANDARD UNIVERSAL ABJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

of the machine and the machine returns to its central position of traverse. It is then ready for the next trim while the strip is being run off into the looping pit.

This Morton will trim materials having a thickness of .056" to .250". Thinner and thicker materials can be trimmed with special cutters and clamping dies. The trimmer has 3" of vertical movement and clearance between the dies. The rams can be quickly removed for inspection and changing cutting tools without disassembling any other part of the machine.

Blind hole tapping lubricant developed by Destiny

After conducting exhaustive tests and consummating numerous satisfactory applications in the metal-working and plastic fabrication fields, Destiny Products Co., 2970 W. Grand Blvd., Dept. BB, Detroit 2, Mich., recently announced the completed development of "Hyper-





tap," a blind hole tapping lubricant.

This lubricant is extruded in solid stick form, similar to a candle in shape. It is intended to assist in the tapping of threads in blind holes.

It is claimed that "Hypertap" eliminates tapping operations preliminary to bottoming by its automatic-hydraulic removal of chips from the hole during the thread-cutting operation. This stick

lubricant permits the use of finishing or bottoming taps at the very start of the thread-cutting operation, and facilitates the tapping of holes to within 1½ threads of the bottom, without the necessity of backing out of the hole to remove accumulated chips.

Microflat honing machine

New features on the Model 844 Microflat microhoning machine (for precision finishing of optically flat surfaces up to 20 inches in diameter), manufactured by the Micromatic Hone Corp., Dept. BB, Detroit 4, Mich., include four different speeds in the head, simultaneous changing of spindle and wheel speeds, motorized wheel dresser mounted on



machine, control of head oscillation, and pneumatic liftup of spindle.

Spindle speed may be changed (independent of wheel speed) by simple insertion in the head of any one of four worm gears, ranging from single to quadruple thread.

Direction of spindle rotation is controlled by a clutch that has three positions: forward, neutral, and reverse.

A knob at the lower right rear side of machine permits easy access to chang-







ing spindle and wheel speeds together. The abrasive wheel is geared to the same motor that drives the spindle, so that the speeds of both spindle and wheel may be proportionately changed at the same time by the one control.

To permit the permanently mounted motorized dresser to swing over the wheel in the dressing position, the head may be moved without disturbing its previously set oscillating stroke.

An air cylinder adds to operator convenience by providing easy liftup of spindle and attached fixture. To save time in lowering the spindle to microhone an additional number of identical parts, an adjustable stop on the quill housing permits repetition of height setting and adjustment for wheel wear.

Improved power rod parter

A new and improved Di-Acro power rod parter for cutting or "parting off" rods and bars (from 1/16" to %") is announced by O'Neil-Irwin Mfg. Co., 562 Eighth Avenue, Lake City, Minn.

Principal improvement in the power rod parter is the replacement of an air-



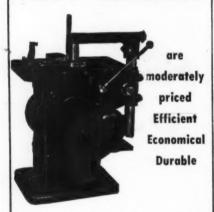
operated power unit with a motordriven flywheel. The flywheel drive, operating at 180 strokes per minute, is said to provide six times the cutting speed previously available.

The new motor-driven unit also offers greater convenience to the user,

"DAVIS" KEYSEATERS

Bridgeport 5, Conn.

CE Station,



Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO. 4071/2 Exchange St. Rochester 8, N. Y. since it can be installed in any plant where electric current is available. No need for air pressure lines, compressors, etc.

An Ejectomatic gage, supplied as standard equipment with the power parter, allows the separate operation of gaging, ejecting and cutting to be performed in a single working cycle. Materials can be "parted off" as fast as the operator can feed stock through the cutting heads and engage the foot clutch. Rate of production varies with length of stock to be cut. Short lengths are gaged and cut more quickly than longer lengths.

Flywheel motor and other moving parts are housed in a welded all-steel

cabinet.

Special heads for cutting square, rectangular, hexagonal and other shaped bars can be supplied on special quota-

Specifications are: maximum material capacity, round steel bar, %"; cutting head thickness, 1"; weight of flywheel, 85 lbs.; strokes per minute, 180; standard motor (optional 110/220 volt AC single phase, 220/440 volt, three phase), ½ h.p.; motor speed, 1750 r.p.m.; operating height, 40 in.; floor space, 17 x 28 in.; net weight, 450 lbs.

Lustro Chrome micrometer

The George Scherr Co., Inc., Dept. BB, 200 Lafayette St., New York 12, N. Y., is introducing a new metal finish called "Lustro Chrome." It is said to be extremely hard and nonpeeling. All graduations are sharp and clear



against the dull chrome background. The Lustro Chrome finish is said to protect the micrometer from rust and discoloration indefinitely.

Another feature is tungsten carbidetipped anvils. The life span is increased 82% with carbide tips.



PORTABLE ELEVATING TABLE



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Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

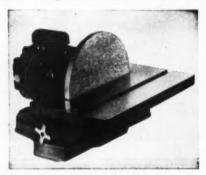
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MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Disc sander for metal or wood

Just announced by Tomlee Tool & Eng. Co., Inc., Dept. BB, Minneapolis 1, Minn., is the No. 85—10" disc sander. It's a versatile grinding and deburring machine, which is also used for chamfering and rounding of corners. It is said to be particularly well adapted for getting into those difficult angles that are so often encountered.

This sander is built from heavy cast iron, with precision machined and bal-



anced face plate to eliminate vibration. The table is accurately ground and slotted to accommodate a mitre gage for the purpose of forming any compound angle up to and including 45 degrees.

Table size is 15½" x 9¾"; height 12". Standard equipment includes sanding disc, faceplate, disc adhesive, and instructions. An easily installed dust collector, motor, and mitre gage are available accessories.

Improved design for Sibley drilling machine

An improved design for its twospindle, 20-inch swing Model MC-20 drilling machine has been announced by Sibley Machine & Foundry Corp., Dept. BB, E. Tutt St., South Bend 23, Ind.

Heavier design in both column and base have been incorporated for rigidity. Although the machine has a capacity of 14" in mild steel, it is also said to be sensitive for small size drills.

The Model MC-20 incorporates a dial indicator for easy selection of geared power feeds and a spring-loaded lever for changing the eight spindle speeds which range from 65 to 1,360 r.p.m.

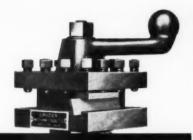
Among features are laminated nonmetallic ways. There is double reduction gearing and double end twin drive with gearing enclosed in sealed baths of oil.

The air-cooled clutch and brake can be controlled either by foot treadle or by palm buttons fastened to the ram, which permit jogging, single stroking and continuous operation. With a motor reversing switch, the flywheel can be



reversed to pull the ram out of accidental stalls.

Self-locking, power-operated ram adjusting screws are fitted with micrometer dials to permit duplication of settings for repeat jobs. By uncoupling the shaft between the screws the ram may be tilted by power for tapered work.



America's first and finest CROZIER TOOL POST TURRET

12 position indexing now makes possible the alignment with work at any thirty degree increment — built-in cut-off tool and holder and positive rapid indexing. They are available in 3 sizes. Save as much as 75% set-up and down time.

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CROZIER MACHINE TOOL CO.

Hawthorne, California







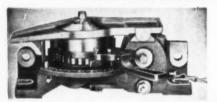
Ever notice how difficult it is in the average catalog—to find EXACTLY the right kind of hand or machine marking device?

New Method's *new catalog* classifies them by the jobs they do... in easy-to-find fashion.

Get your copy. Ask for Catalog No. NM-51.

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A.

MODEL H . . . AUTOMATIC CHUCKING and INDEXING FIXTURE



- 1. 1800 light cuts per hour.
 2. Either horizontal or vertical position.
 3. Collets changed instantly.
 4. Automatically knocks piece out.
- Ratchet or degree indexing degree in-dexing added later if desired. Ca-pacity I".
- pacity 1". Automatic indexer also added later. Model F.—Both degree & ratchet index-ing. Capacity up to 21/4".

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POWER REAMING MACHINE

Will save many times its cost! Ideal for removing burrs after keyseating or tapping of set screw holes. Finish reaming speeded up with increased accuracy. Tedious hand reaming eliminated.

CATSKILL ABRASIVE CUT-OFF TOOL-

A rugged, compact unit for constant production. Cuts accurately a wide range of materials-readily adjustable to cutting of all non-ferrous metals and plastic. Safety and accuracy assured.

JOSEPH E. MURPHY CO. 24 Ellsworth St. Worcester 3, Mass.





Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench-no other tools needed. Get more work now-save money too!

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INSTANT ACTION RAPIDSET



IN 11 SIZES-No. 6 to 1

N.C. In all S.A.E. sizes.

All Purpose Tool Room and Machine Shop Vises.

The

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin

Speedy internal wrenching possible with new ratcheting tool

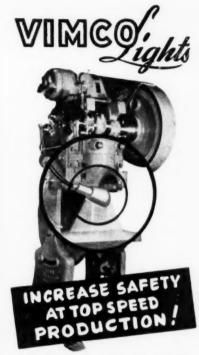
Speedy internal wrenching of Allen head bolts and screws and Phillips screws can now be accomplished with hex and Phillips screw driver adaptors snapped into the TAC open end ratchet wrench, the manufacturer claims. In addition, other TAC adaptors will drive





standard sockets, turnbuckles, plugs and push rod housings. Torque handles can be used with all TAC heads, permitting instantaneous torque reading and accurate control without interrupting wrenching operations.

This new wrench, manufactured by 109 BRAYTON ST.



Walsh Press & Die Co. installs Vimco model No. 347 heavy duty light on their Walsh 12, Hi Speed Punch Press.

Vimcolight cuts down shadows, increases accuracy and creates safer working conditions. You get increased production, too, because operator fatique is reduced.

Install Vimcolights as original equipment. Put the "Vim" in your machines' performance with Vimcolights.

Write for further information on Model No. 347.

SEE BETTER!

WORK BETTER!

VIMCO MFG. CO., Inc.

SINCE 1919

109 BRAYTON ST. BUFFALO 13, N. Y.

the Tubing Appliance Co., Dept. BB, 10321 Anza Ave., Los Angeles 45, Calif., is said to do difficult wrenching jobs much faster and more efficiently, supplanting the usual need for a wide variety of single-purpose tools.

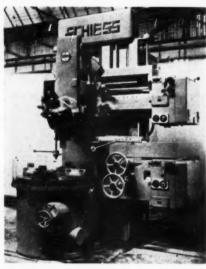
These wrenches come in a range from 3/8" to 4" in 1/16" increments in 64 sizes, making it possible to do the work of an open-end wrench, adjustable wrench, box wrench, socket wrench,

and ratchet wrench.

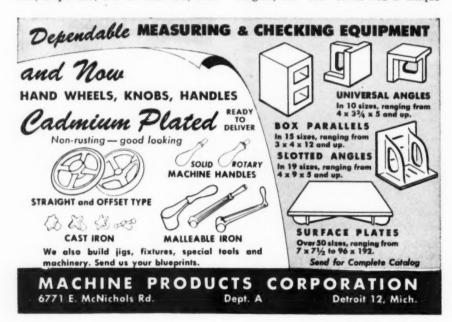
Up to a short time ago, a large proportion of the total production was going to the U. S. government. Now TAC is expanding production facilities as rapidly as possible in order to supply the commercial market.

German lathe for high speed machining

Newly designed Schiess single-column vertical German-made turret lathes, primarily intended for high-speed machining with carbide tools, are now being distributed by Kurt Orban Co., Inc., Dept. BB, 205 E. 42nd St., New York, 17, N. Y. Available in 39", 49" and 65" turning



lengths, the "KE" series has a unique



all-vertical gear drive with the main motor mounted in a vertical position on the back of the machine and directly connected to the gear box through a vibration-absorbing coupling. The gear box is also vertically mounted so that changes in the direction of the drive are transmitted to the table without bevel gears.

Separate column and table base construction permits fine adjustment and close table tolerances against the column ways for both the cross rail and the vertical ram; table runs on tapered roller bearings.

Vertical ram, cross-rail and side head are all counterbalanced. A single lever unlocks, raises or lowers, and locks cross-rail simultaneously by electromechanical controls. There are no bolts or nuts to loosen or tighten by hand.

Hydraulic preselection of speeds can be made while the table is rotating. The desired speed is set by a handwheel and read on an illuminated dial. A stop button slows down table; shift lever engages new speed in a fraction of a second. Sixteen spindle speeds in a ratio of 1 to 50 are provided. Maximum table speed is 310 r.p.m. for KE 100 model.

Direction of feed and rapid traverse are actuated by conveniently grouped spring-loaded mono-lever controls; one for normal feeds, another for rapid traverse. Each lever permits normal directions of feed or rapid traverse plus angular compound feeds.

Wall industrial soldering irons designed for production line

Wall Mfg. Co., Dept. BB, Grove City, Pa., has just introduced a new line of industrial electric soldering irons. They were designed for production line use An exclusive "thermostatic brain"—thermostatic action without the use of thermostats—is said to control heat so perfectly that fusing and tip-burning are eliminated. Iron stays at "on-the-button" production heat, holding replacement and maintenance costs to a minimum.

The Wall irons heat four times faster



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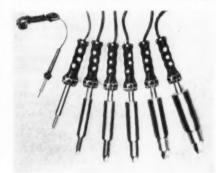


The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil.

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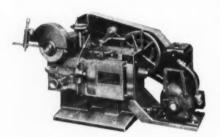
Luma Electric Equipment Co. P. O. BOX 132-H TOLEDO 1, OHIO than ordinary irons, the manufacturer says. There is no radionic interference while irons are in use and they are said to be more economical to use than irons of like wattage because of heat output efficiency.

Irons in this new industrial line range



from 1 ounce to 1000 watts with thermostatic action up to 2600 watts. Irons operate on 110-120 volts, AC or DC.

RESTORES BROKEN SAW TEETH AND SHARPENS THEM in GANGS



Saws can be ganged up, 100 saws at one setting and ground at one time. The 35T Automatic Metal Saw Grinder reclaims them and adds many extra hours of useful life. The saw is fed to the grinder automatically at the rate of 30 teeth to the minute. Grinding is indexed automatically and is accurate to ±.001".

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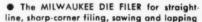
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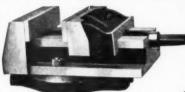
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Automatic drill head mounts at any angle or plane

A self-contained drill unit, which the manufacturer says can be mounted at any angle or plane, is being made by Simplex Tool Eng. Co., 2542 Park Ave., Dept. BB, Detroit 1, Mich.

When used in a special machine, it can be arranged to drill several holes



in a workpiece in a single operation.
All drill units can be set in operation
and controlled by a single start button
or wired to operate in conjunction with
a rotary index table or selected cycle.
Featuring constant oil bath and ball

Featuring constant oil bath and ball bearing motor, units are made in progressive sizes with capacities from No. 50 to 5/15".

Midget motor

What is said to be one of the smallest electric motors, and most powerful for its size, ever manufactured, is currently being mass produced by Connecticut Telephone & Electric, Dept. BB, Meri-



den, Conn. Built to military specifications of size and performance, it measures 1" x $1\frac{1}{8}$ " x $2\frac{1}{2}$ ", small enough to fit into a watch pocket.

Two models are available with exacting speeds of 8,000 or 12,000 r.p.m.

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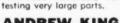
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WEST GERMANY

Horizontal master comparator

A new measuring instrument is announced by Federal Products Corp., 1253 Eddy St., Dept. BB, Providence, R. I.

One of the features claimed for the instrument is the fact that a constant pressure is applied to the sides of the workpiece by each contact at every point of measurement. This pressure is the same for every part inspected. The design of the mechanism that makes this possible was one of the basic objectives in designing the instrument.

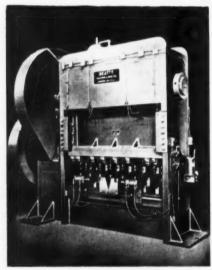
The operator has a selection of 4 magnifications: 500 to 1, 1,500 to 1, 5,000 to 1, and 15,000 to 1; all on the same meter. These magnifications, together with the exceptional range of the measuring contacts, make it possible for the operator to use the same instrument to trace work from rough grind to finished lap with the ease of the setup on low magnification, and then quickly switch to high magnification for accurate size determination.



Beatty adds plate and angle punch

A machine, called the No. 10 guillotine plate and angle punch, for the purching of angles, webs of sections or flat plates, has been added to the line of heavy metal - working machinery manufactured by the Beatty Machine Mfg. Co., Dept. BB, 948 150th St., Hammond, Ind.

The first of the new machines was



shipped to Bolta Redonda, Brazil, where it will be used in the fabrication of structural steel.

The No. 10 guillotine punch has a capacity of 250 tons, and is furnished with tools and positioners. Distance between housings is 74". The ram is 72" long, right to left; 24" front to back; and the ram has a stroke of 2\(\frac{1}{2}\)". The drive is of the mechanical type.

Dymondcut dresser

Simple construction, efficiency, versatility and low cost, are the outstanding features claimed for this diamond dresser, made by Hazerodt Associates, Dept. BB, 416 Ford Bldg., Detroit 26, Mich.

The Dymondcut dresser is designed for use on pedestal, hand, carbide, surface, disc and toolroom grinders. It can be used also for either angle or side dressing.

This dresser is recommended for



wheels up to 10" diameter. Special applications are available for larger wheels.

Topflight tape in inventory control operations

A paper, self-adhesive tape, TFP-10, made by Topflight Tape Co., Dept. BB, York, Pa., has a surface that can easily be written on, and it is used to place information on parts and bins in stockrooms. It can easily be removed when articles move or inventory figures change.

For large units and material stored outside factory building, waterproof cloth adhesive tape, TFS-11, is used for the same purpose. This tape has a white waterproofed cloth surface which can be written on with pencil, ink or crayon. The pressure-sensitive adhesive is also waterproof. Neither is it affected by extreme cold temperatures.

Flame-resistant canvas

Impregnated, flame-resistant canvas curtains and blankets that can be hung to form inexpensive booths to screen off dangerous operations are now being offered by Eastern Equipment Co., Inc., Dept. BB, Willow Grove, Pa. The curtains and blankets afford protection for workers near arc welding and other operations. Curtains are made to individual requirements from 8, 10 or 12-oz. duck and from Underwriters grade, asbestos cloth in sizes to cover 100 sq. ft.

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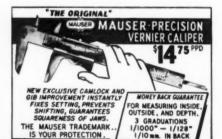
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New automatic bar machine

A new automatic bar machine has been specially designed to cut costs in the mass production of turned and threaded screw parts of brass and other non-ferrous metals, for the radio and electrical equipment field. The unit has been built to use either coiled or bar stock, performs two operations simultaneously, lowers setting up time, reduces scrap and by its greatly increased productive capacity per hour is claimed to offer unsurpassed efficiency. Stock and rotating tools are stationary. This makes use of coiled material possible. Material is fed by two feed spindles. Three tooling spindles face these feed spindles; they are mounted on a swivel type head with two drilling and turning spindles operating on either side, and a third thread cutting spindle mounted in center. In operation, the thread cutting spindle works together with one of the outer spindles. The tooled part is cut off from coil or bar by circular saws. Machine is built by Dr. Ing. Boehme & Co., Minden/Westphalia, West Ger-



many, and distributed in the U. S. by Alwin Fr. Wilkins, 15 Moore St., New York 4, N. Y.



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machine output up to 30% I Wark pieces from paper thinness to 7½" are quickly clamped. Work-holding foot in horizontal position firmly grips narrow ledges or steps . . . also round bar stock in V-blocks. Available in "production" and "tool room" models.

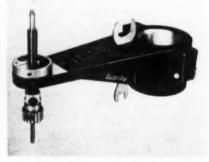
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CARROLL & SHIPLEY, Inc.— 720 W. 12th Street ANDERSON, INDIANA

Improved lead screw tapping attachment

An improved lead screw tapping attachment, for use in a standard drill press, that it is claimed will take the tapping load off the tap and leave the tap free for thread cutting only has been developed by Automatic Methods, Inc., Div. 165, 42 Walnut St., Newark, N.J.

The "rolled thread" lead screw and adjustable split-nut in which it works carry the driving load, whether applied by an unskilled operator or by other driving force, thereby taking the



strain from the tap except that required for actually cutting the thread. This new tapping attachment is designated as the "Auto-tap."

A new type of arm for attachment to standard drill presses has also been provided. This arm is aluminum cast in a pressure mold for strength and precision.

The only tools needed for assembly of the "Auto-tap" to a drill press and for interchanging lead screws and split driving nuts, when different pitches are used, are two small wrenches (an open end and an Allen wrench). The new arm has a slot and a hole provision for holding them ready for use.

Taps are held in Jacobs Rubberflex collets and accommodate sizes from No. 0 to 1/4" and No. 10 to 5/16". The new lead nut is adjustable to compensate for wear. Interchangeable lead screws and lead nuts are stocked in the following pitches: 20, 24, 28, 32, 36, 40, 44, 48, 56, 64, 72 and 80.



Marvin surface grinder dividing head

A new surface grinder dividing head supplied with 3 index plates, each having six sets of holes; and a bed plate 1" x 3" x 16", is being manufactured by Marvin Machine Products, Inc., Dept. BB, 414 Ford Bldg., Detroit 26, Mich.

This equipment makes the application of the dividing head possible for use with the surface grinder for the production of an infinite number of shapes and parts.



THE MARKET PLACE

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MARKET PLACE—continued



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MANUFACTURERS' REPRESENTATIVES Well-established manufacturer of nationally ac-cepted line of Live Centers and production tools is seeking active representation by first-line repre-sentatives. Write fully giving scope and nature

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c/o Machine and Tool Blue Book Wheaton, Illinois IS YOUR BUSINESS FOR SALE?

We are interested in purchasing a manufacturing plant producing an established and accepted prod-uct. Jobbing plants might be considered. We are principals, not brokers, so feel free to write in confidence to

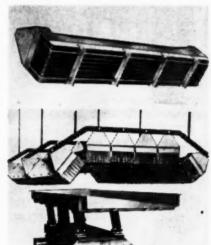
BOX 127 c/o Machine and Tool Blue Book Wheaton, Illinois

Infra-rad radiant heating panels

Utilizing Syntron flat surface electric heating elements, the Syntron Co., 300 Lexington Ave., Homer City, Pa., is producing infra-red radiant heating panels which heat by direct radiation, eliminating the use of reflectors. These infra-red panels throw a flat, uniform radiating pattern that lowers production costs and time on most all baking. drying and heating processes, it is claimed.

The panels are made up with from two to eight of the flat surface elements backed up by thermal backing insulation, securely mounted to a steel boxtype frame equipped with mounting flanges.

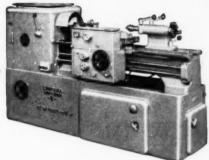
By means of the mounting flanges, the panels can be set up in various arrangements to form ovens, dryers, heaters, etc., for operation on any commercial a-c or d-c frequency.



Mechanics Through The Ages



this Cri-Dan "B"...





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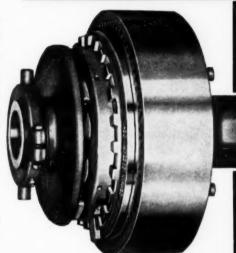
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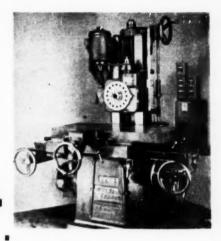
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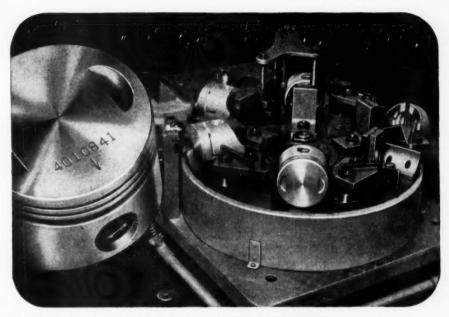
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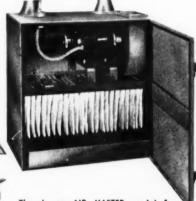
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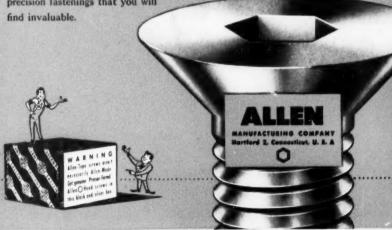
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